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FIJI ARTHROPODS VIII

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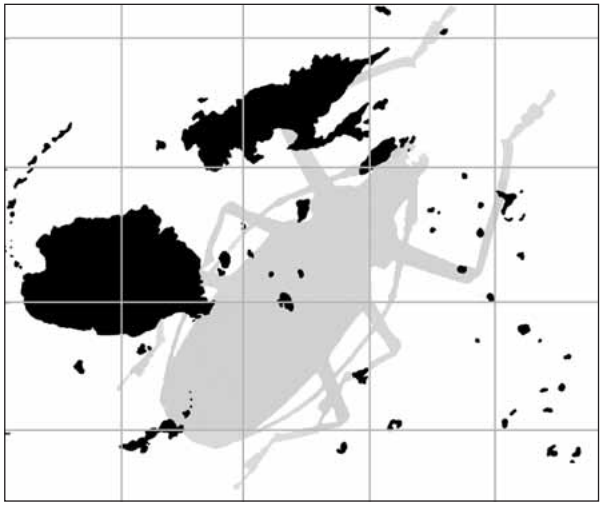

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FIJI ARTHROPODS

Editors' Preface

We are pleased to present the eighth issue of *Fiji Arthropods*, a series offering rapid publication and devoted to studies of terrestrial arthropods of the Fiji Group and nearby Pacific archipelagos. Most papers in this series will be the results of collecting and research on the Fijian fauna deriving from the NSF-funded "Terrestrial Arthropods of Fiji" project. Five co-PIs and 18 specialists (see Fiji Arthropods I, p. 18) form the core team of scientists who have agreed to publish new taxa that result from collecting during this survey. However, as space allows, we welcome papers from any scientist who is currently working on arthropod taxonomy in Fiji.

This issue contains results of discoveries of new species of Cerambycidae (Coleoptera—Lingafelter), Buprestidae (Coleoptera—Bellamy), and Pipunculidae (Diptera—Skevington). Manuscripts are currently in press or in preparation on Scelionidae, Lauxaniidae, Keroplatidae, Mycetophilidae, Mythicomyiidae, Limoniidae, Dolichopodidae, Stratiomyidae, Asilidae, and Sciaridae and will appear in future issues.

The editors thank the Government of Fiji (especially the Ministries of Environment and Forestry), the National Science Foundation (DEB 0425970), and the Schlinger Foundation for their support of this project. Types of new species deriving from this study and voucher specimens will be deposited in the Fiji National Insect Collection, Suva.

All papers in this series are available free of charge as pdf files downloadable from the following url:

http://hbs.bishopmuseum.org/fiji/fiji-arthropods/

We encourage interested authors to contact us before submitting papers.

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Fiji Arthropods VIII Edited by Neal L. Evenhuis & Daniel J. Bickel. *Bishop Museum Occasional Papers* 93: 3–11 (2007).

Two New *Distenia* Lepeletier & Serville from Fiji with a Key to the Known Melanesian Species (Coleoptera: Cerambycidae: Disteniinae)[1]

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Abstract. Two new species of *Distenia* are described and a key to all known species of the genus *Distenia* in Melanesia is presented. *Distenia dillonorum* sp. nov. is from Taveuni (Fiji) and *D. gressitti* sp. nov. is from Taveuni, Kadavu, and Vanua Levu (Fiji).

INTRODUCTION

The Disteniinae is an unusual group of longhorned beetles that occurs throughout Asia, Africa, and the New World (but absent from the most of the Palearctic and Australia). Due to unusual characters [*adults*: antennae inserted anteriorly near the base of mandibles; reduced or absent antennal tubercles; mesal antennal setose groove (described herein); *larvae*: gular bridge absent; clypeus membranous and lacking setae], they have been treated by some authors as a distinct family (e.g., Svácha & Danilevsky, 1987). Of the approximately 12 genera and 200 species, the genus *Distenia* Lepeletier & Serville is the most widespread and speciose (Monné & Hovore, 2005). Host plants for *Distenia* are poorly known. Those listed for Asia include *Holigarna*, *Mangifera*, *Dipterocarpus*, *Abies*, *Pinus*, and *Picea* (Duffy ,1968; Gressitt ,1951c).

The Melanesian fauna of *Distenia* has few known species. In 1923, Schwarzer described the first known species, *D. bougainvilleana*. Gressitt described *D. bougainvillea*, also from Bougainville (Gressitt, 1951a), but later that year recognized that it was a synonym of *D. bougainvilleana* Schwarzer (Gressitt, 1951b). The next described species was *D. punctulata* from Viti Levu in Fiji, described by Dillon & Dillon in 1952. In 1959, Gressitt described the most recent species of *Distenia*, *D. minor* from New Britain. Bigger & Schofield (1983) listed all the known species of *Distenia* from Melanesia but did not mention *D. punctulata* Dillon & Dillon. In the present work, two new species are described and differentiated from the previously known species. A key to all species of *Distenia* from Melanesia is presented.

MATERIALS AND METHODS

This study is the result of a National Science Foundation Biotic Surveys and Inventories grant for Fiji (Evenhuis & Bickel, 2005) for which I am a collaborator. The material included is based on an expedition there in November 2005 and from Malaise trap sampling conducted by Neal Evenhuis and Evert Schlinger throughout many Fijian islands. Additional material was examined from the Bishop Museum (BPBM) and U.S. National Museum (USNM).

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1. Contribution No. 2007-008 to the NSF-Fiji Arthropod Survey.

SYSTEMATICS

Distenia dillonorum Lingafelter, **new species**
(Figs. 1, 3a)

Description. Moderate size, 21–24 mm long; width at humeri 5–6 mm; integument piceous except for reddish brown antennae, femora and venter. Elytra and pronotum shining, but mostly covered in conspicuous, short, orange pubescence. Pubescence elsewhere (except for margins of eyes) inconspicuous. *Head* with antennal tubercles not protruding and connecting anteriorly in straight line. Head mostly impunctate and glabrous with exception of few fine punctures at extreme post-occiput, and dense fringe of orange hairs around eyes; head moderately, gradually constricted at post-ocular region. Head with pronounced vertex and frontal sulcus extending approximately to posterior margin of eyes. Eyes large, coarsely faceted, with weak indentations around antennal insertions; eye lobe extends over two-thirds thickness of head with lower lobe larger than remainder when viewed laterally. Upper eye lobes separated by distance greater than middle pronotal callus width. *Antennae* of male long, slender, extending by about 6 segments beyond elytral apex. Scape at apex less than twice as wide as base, remaining antennomeres cylindrical, barely enlarged and darkened apically; antennomere 2 very short, 3 longest, thereafter successively decreasing slightly in length to the tenth. Antennomere 11 slightly longer than 10, with vaguely noticeable subapical constriction. Antennae covered with very fine, short, orange pubescence, slightly longer towards apex of antennomeres. Antennae with unusual mesal groove extending from 3–11, with very long but recessed orange hairs lying lengthwise in groove. Antennae of females as in male, but extending by about 5 segments beyond elytron. *Pronotum* with large middle callus surrounded by four peripheral calli and with two large, broadly based lateral tubercles; anterolateral calli strongly projecting dorsally. Pronotum generally impunctate, with moderate anterior and posterior constrictions; middle callus indistinctly rugose. Dense, orange pubescence around middle callus and between middle and peripheral calli. Lateral pronotal tubercle with broad base tapering to narrow, blunt apex. *Elytra* at base much broader than pronotal base; slightly broader than lateral tubercles; strongly tapering to apex; apex subtruncate. Coarsely, deeply punctate and granulate around basal one-third; large punctures continuing mostly in about 4 rows to apex; rows separated by broad fasciae of dense, orange pubescence. *Scutellum* with dense, orange pubescence, rounded and tapering posteriorly. *Legs* reddish brown on femora, darker piceous on tibiae and tarsi. Femora cylindrical; metafemora not attaining elytral apex in either sex. *Venter* with inconspicuous coating of orange and translucent pubescence; impunctate except for sparse punctures on metasternum. Prosternal process very narrow (narrower than base of palpi); weakly expanded at apex. Procoxal cavities widely open posteriorly by at least two-thirds width of procoxa. Mesosternal process broad between coxae over half as broad as mesocoxa. Metasternal sulcus pronounced, attaining anterior third of metasternum. Abdominal sternites successively narrowing; ventrite 5 longer than wide and relatively longer in females than males.

Discussion and Diagnosis. *Distenia dillonorum* is very similar in appearance to *D. punctulata* Dillon & Dillon, but differs in having the elytral pubescence orange (not gray-fulvous) and interrupted by rather distinct rows of punctures and lacking a large apical interruption that is present in *D. punctulata*. *Distenia dillonorum* has the elytral granules extending to the basal one-third to one-half of the elytron (but restricted to the extreme base in *D. punctulata*). All three known specimens of *D. dillonorum* are larger than 20 mm (ranging from 21–25 mm), whereas in *D. punctulata* the specimens range from 14-17 mm. *Distenia dillonorum* is known only from Taveuni island in Fiji while *D. punctulata* is known only from Viti Levu.

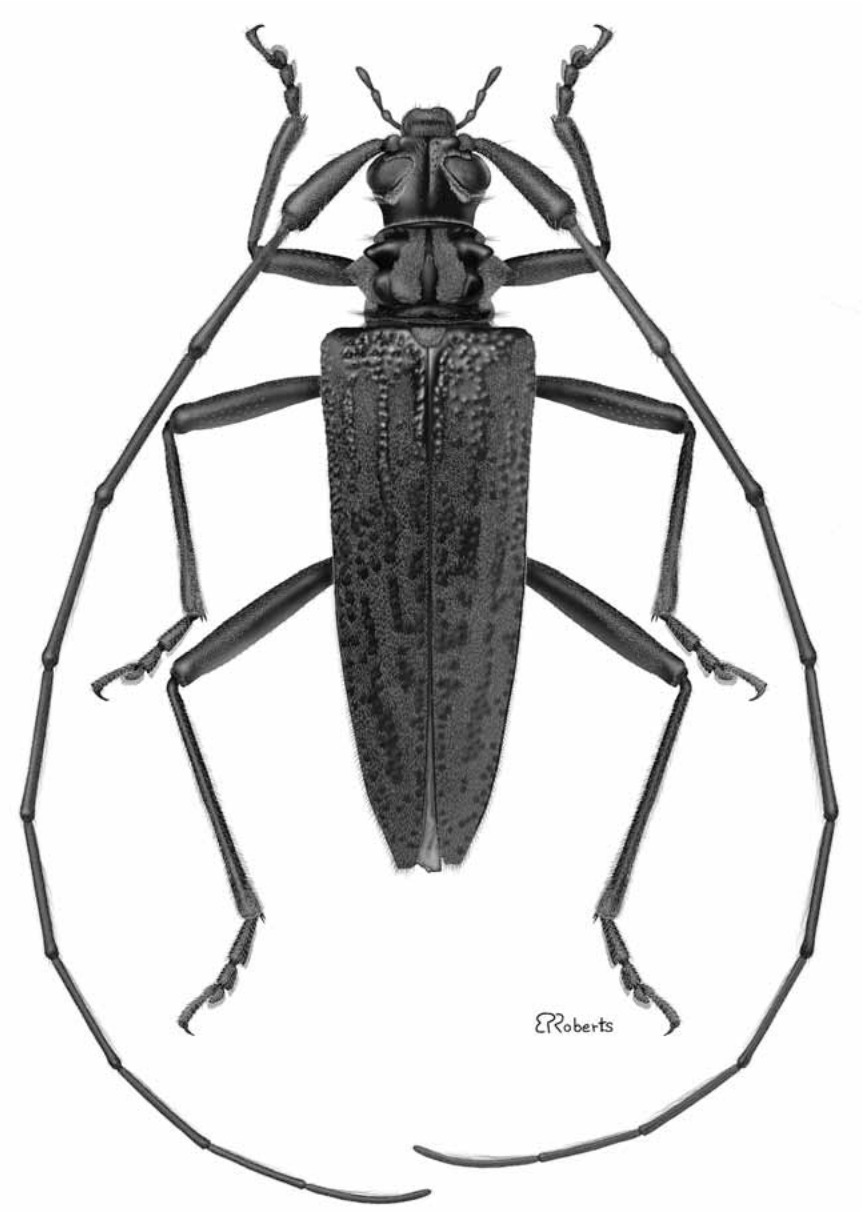


Figure 1. *Distenia dillonorum* Lingafelter, new species (female, length 21 mm). Illustration by Elisabeth Roberts.

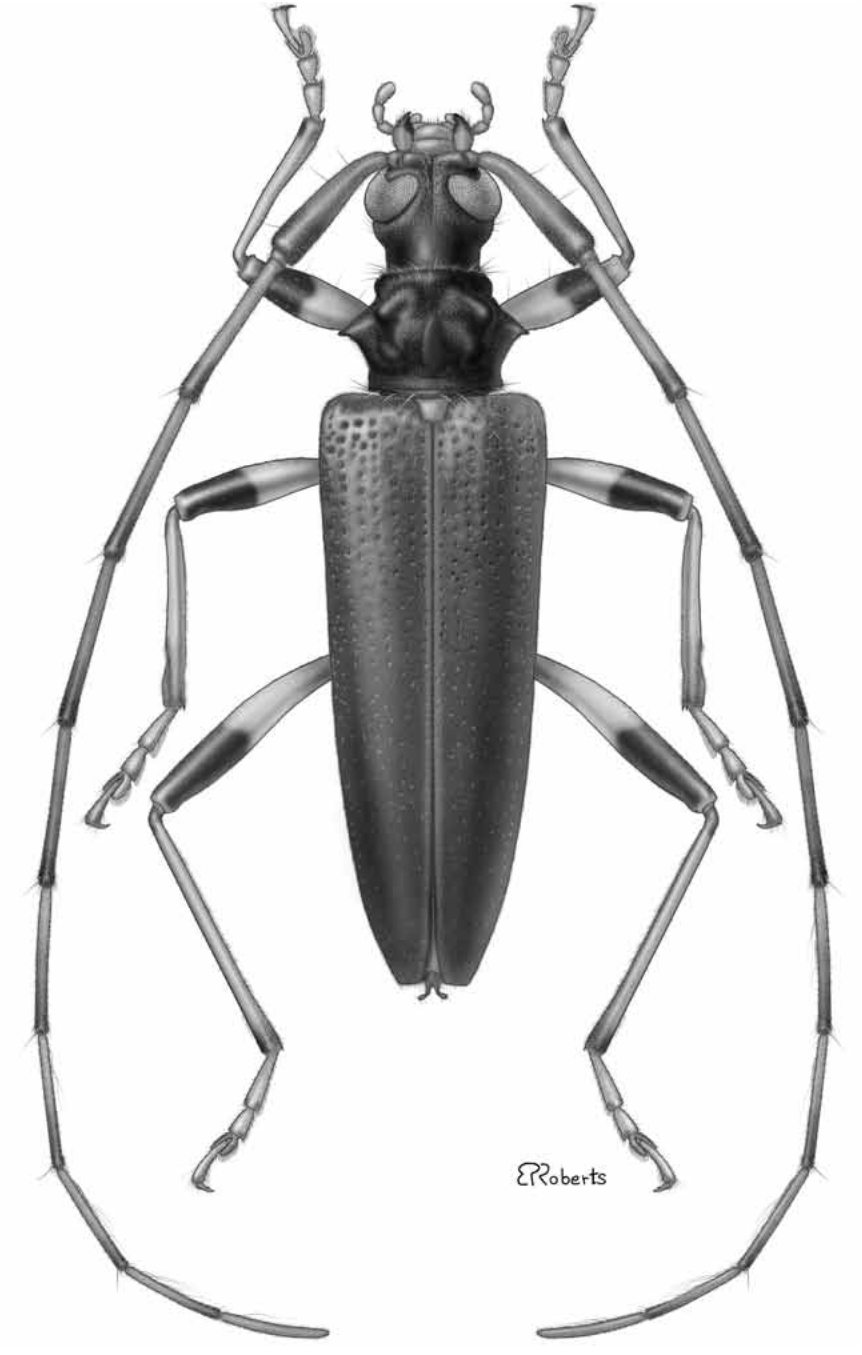
Etymology. This species is named in honor of Lawrence and Elizabeth Dillon who made the foundational study of Cerambycidae of Fiji in 1952.

Types. *Holotype* male from FIJI: **Taveuni**: Devo Forest Reserve, 21 Nov 2005, 800 m, 16°50'S, 179°59'E, Steven W. Lingafelter, on dead tree trunk at night (BPBM, to be deposited in Fiji National Insect Collection, Suva, Fiji). *Paratypes*: 1 male, same data as holotype (USNM); 1 female, same data as holotype (BPBM).

Distenia gressitti Lingafelter, **new species**
(Figs. 2, 3b)

Description. Moderate size, 9–13 mm long; width at humeri 2–3 mm; integument mostly dark reddish brown. Antennomeres (except apices), basal half of femora, tibiae (except for extreme base and apex), pale yellow-brown. Elytra, sides of prothorax, venter, and antennae moderately shining, but covered in short, translucent pubescence and sparsely scattered long setae. Pubescence elsewhere sparse and inconspicuous. *Head* with antennal tubercles not protruding; connecting anteriorly in weakly concave line. Head generally micropunctate and glabrous. Punctures larger between upper eye lobes. Eye margins without dense fringe of hairs; head moderately, gradually constricted at postocular region. Head with shallow vertex and frontal sulcus extending just posterior to margin of eyes. *Eyes* large, coarsely faceted, with weak indentations around antennal insertion; eye lobe extending nearly full thickness of head with lower lobe two-thirds larger than remainder when viewed laterally. Upper eye lobes separated by distance greater than middle pronotal callus width. *Antennae* of male long, slender, extending by about 5 segments beyond elytral apex. Scape at apex less than twice as wide as base, remaining antennomeres cylindrical, not enlarged apically; darkened at apical one-fourth to one-third; antennomere 2 very short; 3–10 subequal or successively decreasing slightly in length; antennomere 11 slightly longer than 10, with vaguely noticeable subapical constriction. Antennae covered with very fine, short, translucent pubescence, slightly longer towards apex of antennomeres. Antennae with vague mesal groove extending from segments 3–11, with very long hairs lying recessed, lengthwise in groove. Antennae of females as in male, but extending by about 4 segments beyond elytron. *Pronotum* with small middle callus surrounded by four peripheral calli and with two large, broadly based lateral tubercles; anterolateral calli weakly projecting dorsally. Pronotum micropunctate, with scattered indistinct, larger punctures; weak anterior and posterior constrictions; middle callus not rugose. Pubescence uniformly sparse, translucent and inconspicuous on disk; more dense laterally. Lateral pronotal tubercles with broad base, variably tapering to short or long, narrow, blunt apex. *Elytra* at base much broader than pronotal base; slightly broader than lateral tubercles; moderately tapering to apex; apex subtruncate. Elytra with coarse, separate, deep punctures throughout; becoming shallower and sparser towards apex. Punctures each slightly darker than surrounding integument. No granules present. Pubescence uniformly inconspicuous, without fasciae. *Scutellum* without denser pubescence than surrounding integument; truncate and tapering posteriorly. *Legs* yellow brown except for basal half of femora and extreme apex and base of tibiae which are darker piceous. Profemora weakly enlarged at middle; meso- and metafemora cylindrical in males to very weakly enlarged at middle in females. Metafemora attaining apical fourth of elytra in both sexes. *Venter* with inconspicuous vestiture of translucent pubescence; impunctate except for sparse punctures on metasternum. Prosternal process very narrow (narrower than base of palpi); weakly expanded at apex. Procoxal cavities open posteriorly by between one-half and two-thirds width of procoxa. Mesosternal process broad between coxae, about one-third (males) to half

Figure 2. *Distenia gressitti* Lingafelter, new species (female, length 13 mm). Illustration by Elisabeth Roberts.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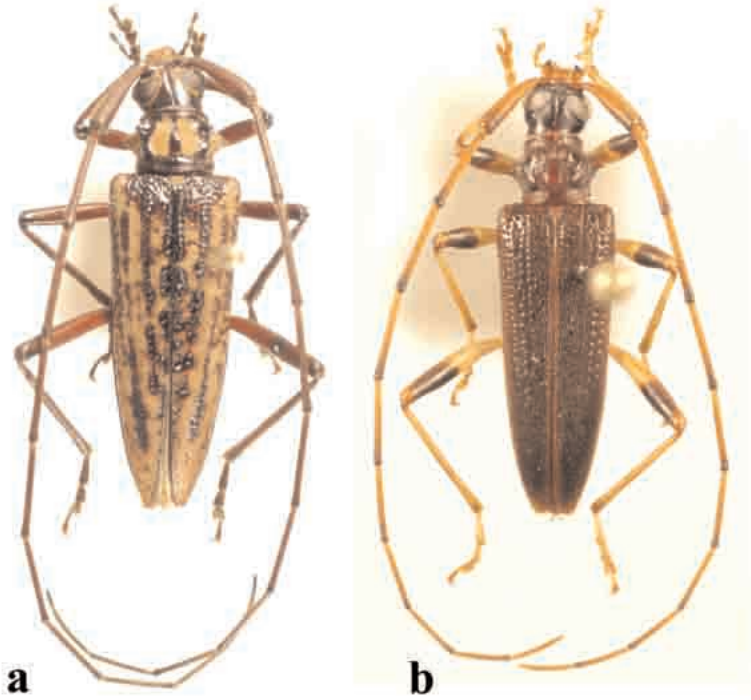

Figure 3. Color dorsal habitus of *Distenia*: a) *Distenia dillonorum* Lingafelter, new species; b) *Distenia gressitti* Lingafelter, new species.

(females) as broad as mesocoxa. Metasternal sulcus pronounced, attaining anterior third of metasternum. Abdominal sternites successively narrowing; ventrite 5 longer than wide in both sexes. Ventrite 5 moderately notched at apex in males; rounded in females.

Discussion and Diagnosis. *Distenia gressitti* is very similar to *D. bougainvilleana* Schwarzer but differs in not having the outer elytral apex produced (or very slightly), in having punctures on the elytron extending beyond the basal half, in not having the prothoracic spines angled posteriorly and upward, and in having the tarsomeres unicolorous. Furthermore, *D. bougainvilleana* is known only from the island of Bougainville (approximately 3000 km distant from Fiji). From *D. minor* Gressitt, *D. gressitti* differs in being reddish brown or dark brown (not purplish brown), in not having the slight sutural and apicolateral projections at the end of the subtruncate elytral apices, and in the slightly larger size of most specimens (greater than 10 mm in length). Furthermore, *D. minor* is known only from New Britain (approximately 3500 km distant from Fiji).

Etymology. This species is named in honor of J. Linsley Gressitt who published extensively on Cerambycidae of Asia, Micronesia, and Melanesia.

Types. *Holotype*, male, FIJI: **Taveuni**: Devo Forest Reserve, 10–17 Oct 2002, FJ-9 Malaise, M. Irwin, E. Schlinger, M. Tokota'a, 800 m, 179°59'E, 16°50'S, [FBA 008340] (BPBM, to be deposited in Fiji National Insect Collection, Suva, Fiji). *Paratypes* (23 total): FIJI: **Taveuni**: Devo Forest Reserve, 21 Nov 2005, 800 m, 16°50'S, 179°59'E, Steven W. Lingafelter, on dead tree trunk at night (2 females, USNM); 3.3 km NW Lavena Village, Mt. Koronibuabua, 219 m, 8 Jan–5 Feb 2005, Malaise 4, Soroalau, 16.855ºS, 179.880ºW, [FBA 512322] (1 female, BPBM); 5.3 km SE Tavuki Village, Mt. Devo, 1064 m, 28 Jan–11 Feb 2005, Malaise 3, P. Vodo, 16.841ºS, 179.968ºW, [FBA 511888] (1 male, USNM); same but FJTA09 (1 female, USNM); same but 734 m, 7–23 Oct 2004, Malaise trap, FJTA09 [FBA 512058] (1 male, 2 females, USNM); same but FBA 512059, 512070 (2 females, BPBM); same but 30 Jun–31 Jul 2004, Malaise 3, [FBA 148342] (1 female, BPBM); same but 3–20 Jul 2002, [FBA 154680] (1 female, BPBM); 5.6 km SE Tavuki Village, Malaise, rainforest 3–10 Jan 2003, Schlinger, Tokota'a, FJTA8aM01-12, 179.965°E, 16.843°S, 1187 m, [FBA 058780] (1 female, BPBM); Devo Peak, 5.6 km SE Tavuki Village, 1187 m, Malaise 1, 20–27 Jul 2002, Schlinger, Tokota'a, 16.843ºS, 179.966ºW, [FBA 144666–144667] (2 females, BPBM); same but FBA 144665 (1 female, USNM). **Vanua Levu**: 0.6 km S. of Rokosalase Village, 23 Apr–8 May 2004, Malaise in forest, Schlinger, Tokota'a, FJVN57eM05-03, 179.0181°E, 16.5333°S, 180 m, [FBA 054320] (1 female, BPBM); Trans-insular Road, above summit, 500–550 m, 6–9 Oct 1979, Malaise Trap, S.N. Lal, G.A. & S.L. Samuelson (1 female, BPBM); Kilaka, FJ-58E, 28 Jun–21 Jul 2004, 178º59'290"E, 16º 48'41.2"S, M.E. Irwin, E. Schlinger, M. Tokota'a, 98 m, Malaise, [FBA 029049] (1 female, BPBM). **Kadavu**: 1.3 km E. Kadavu air strip, nr. Ramilata Village, 120 m, 18 Sep 2004–11 January 2005, Malaise 2, M. Reece, 19.06ºS, 178.169ºE, FBA 511733, 511851 (2 females, BPBM); 0.25 km SW Solodamu Village, Moanakaka Bird Sanctuary, 178.121°E, 19.078°S, 60 m, 23 Oct–6 Nov 2004, Malaise trap, M02, S. Lau (2 females, USNM).

Key to *Distenia* of Melanesia

1. Elytral pubescence dense, contrastingly colored with integument, and distinctly interrupted by rows or areas of punctures. Pronotum with conspicuous pubescence that is interrupted by glabrous vittae 2

—. Elytral pubescence uniformly dense, but not conspicuous or distinctly interrupted by punctures. Pronotum with pubescence inconspicuous and not divided by glabrous vittae 3

2. Only extreme base of elytra granulate. Elytral pubescence color grayish fulvous. Known specimens 14–17 mm in length. (Fiji: Viti Levu) ..... ***Distenia punctulata*** Dillon & Dillon

—. Basal one-third to one-half of elytra granulate. Elytral pubescence color orange. Known specimens 21–24 mm in length. (Fiji: Taveuni)..... ***Distenia dillonorum*** Lingafelter**, n. sp.**

3. Elytral punctures restricted to basal half. Lateral prothoracic spines angled posteriorly and upward. Outer apex of elytra acute and produced more than at suture. Tarsomeres darkened at apices. Known specimens 16–18 mm in length. (Bougainville) ..... ***Distenia bougainvilleana*** Schwarzer

—. Elytral punctures extending beyond basal half (although not as pronounced towards apex). Lateral prothoracic spines not posteriorly directed and barely angled upward or not at all. Elytral apex subtruncate or with small sutural and outer apical projections. Tarsomeres mostly unicolorous. Known specimens 9–15 mm in length. (Fiji & New Britain) 4

4. Integument dark purplish brown and covered with inconspicuous, but dense, thin silvery pubescence. Elytra very slightly tapered towards apex which is subtruncate with slight sutural and outer apical projections. Known specimens 8–10 mm in length. (New Britain) ..... ***Distenia minor*** Gressitt

—. Integument reddish brown to dark brown and covered with inconspicuous translucent pubescence. Elytra moderately tapering posteriorly towards apex which is subtruncate and without projections. Known specimens 9–13 mm in length. (Fiji: Kadavu, Taveuni, Vanua Levu) ..... ***Distenia gressitti*** Lingafelter**, n. sp.**

ACKNOWLEDGMENTS

I thank Neal Evenhuis and Evert Schlinger for inviting me to be a collaborator on the NSF grant. Funds from this study came in part from USDA, the Schlinger Foundation, Bishop Museum, and the National Science Foundation (DEB 0425790). The Fiji Ministries of Environment and Forestry are thanked for their support of the project. David Olson, Al Samuelson, Moala Tokota'a, and Akinisi (Cagi) Caginitoba handled the Fiji travel and collecting logistics. Thanks to Chuck Bellamy, Chris Reid, Al, David, Moala, and Cagi for their camaraderie and longhorned beetles collected during the 2005 expedition. Thanks to Alistair Ramsdale and Terry Lopez (BPBM, Honolulu, Hawaii) and Leah Brorstrom (The World Spider-Endoparasitoid Lab, Santa Ynez, California) for their work in sorting and distributing specimens on which this study and others are based. Natalie Allen and Elisabeth (Lisa) Roberts pinned specimens from the Malaise trap samples. Special thanks to Lisa for the excellent computer illustrations of the new species. Thanks to Jens Prena for translating Schwarzer's German description of *Distenia bougainvilleana*, and to Gino Nearns, Norman Woodley, Diethard Dauber, and Allen Norrbom for their reviews of the manuscript.

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The genera *Aphanisticus* Latreille and *Endelus* Deyrolle in Fiji (Coleoptera: Buprestidae: Aphanisticini)[1]

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Abstract. The first species of *Aphanisticus* Latreille, *A. cochinchinae* ssp. *seminulum* Obenberger, is recorded from Fiji and illustrated. Four new species of *Endelus* (*Endelus*) Deyrolle are described from Fiji: *E. cupreocingulatus*, sp. nov., *E. cupreoviridis*, sp. nov., *E. fijiensis* sp. nov. and *E. castaneocupreus* sp. nov. *Endelus bicolor* Bellamy is proposed as a new junior synonym of *E. speculifer* Théry The Fijian species of *Endelus* are described, illustrated, and differentiated in a key.

INTRODUCTION

The buprestid genus *Aphanisticus* Latreille (Coleoptera: Buprestidae: Aphanisticini) is a relatively large genus (354 species, 6 subspecies) found throughout the continents and habitats of the Old World, but until recently not known from the New World or Oceania. The introduction of one subspecies (*A. cochinchinae* ssp. *seminulum* Obenberger) into the Hawaiian archipelago and its association with sugarcane (Chang & Oto 1984, Heu 1986) has been followed by further spread into sugarcane fields in the United States (Wellso & Jackman 1995, Peck & Thomas 1998, MacRae & Nelson 2003) and south into various areas in Latin America (Hespenheide, pers. comm.). It is not surprising to find that it has also spread to Fiji, although the specimens collected as part of the Fiji Arthropod Survey come from outside of the sugarcane fields of Viti Levu suggesting that it can utilize other grasses, whether native or other introduced species.

The genus *Endelus* Deyrolle currently contains 119 species distributed in the Australasian and Oriental biogeographic regions with some species found on various Western Pacific islands including Fiji. Two Fijian species are currently known: *E. speculifer* Théry and *E. bicolor* Bellamy. With the wide ranging collecting activity of the Fiji Arthropod Survey, especially the very productive use of malaise traps, four additional species are available for description.

The term "belt-buckle setae" was first used by Wellso *et al*. (1976) in describing *Pachyschelus confusus* Wellso & Manley and later by Bellamy & Hespenheide (1988) describing two buprestids from South Africa: *Paracylindromorphus cephalopristis* Bellamy and *Taprocerus capensis* Hespenheide. This structure is present in all species of *Endelus* from Fiji, discussed and/or described herein.

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1. Contribution No. 2007-009 to the NSF-Fiji Arthropod Survey..

MATERIALS AND METHODS

Abbreviations. The following collection codens are used in the text: BPBM - Bishop Museum, Honolulu, Hawai'i, USA; CLBC – my research collection, this address; CSCA – California State Collection of Arthropods, Sacramento, California, USA; FNIC, Fiji National Insect Collection, Suva, Fiji; MNHN, Museum National d'Histoire Naturelle, Paris, France; NMPC – National Museum, Prague, Czech Republic. Label data are cited verbatim. For handwritten and printed label data, "(h)" and "(p)" are used respectively.

SYSTEMATICS

Tribe **APHANISTICINI**

Two subtribes comprise this tribe: the nominate Aphanisticina which contains only two genera, *Aphanisticus* and *Endelus*, and Anthaxomorphina, which is monotypic for *Anthaxomorphus* Deyrolle. *Anthaxomorphus* is not recorded from any of the Pacific islands and known species are found no closer than Indonesia, Papua New Guinea, and the Philippines.

Subtribe **APHANISTICINA**

Genus *Aphanisticus* Latreille

Aphanisticus Latreille, 1829: 448; Obenberger, 1937: 1285; Bellamy, 2003: 92. Type species: *Aphanisticus pusillus* Gyllenhal, 1808 (fixed by subsequent designation: Westwood, 1838: 25).

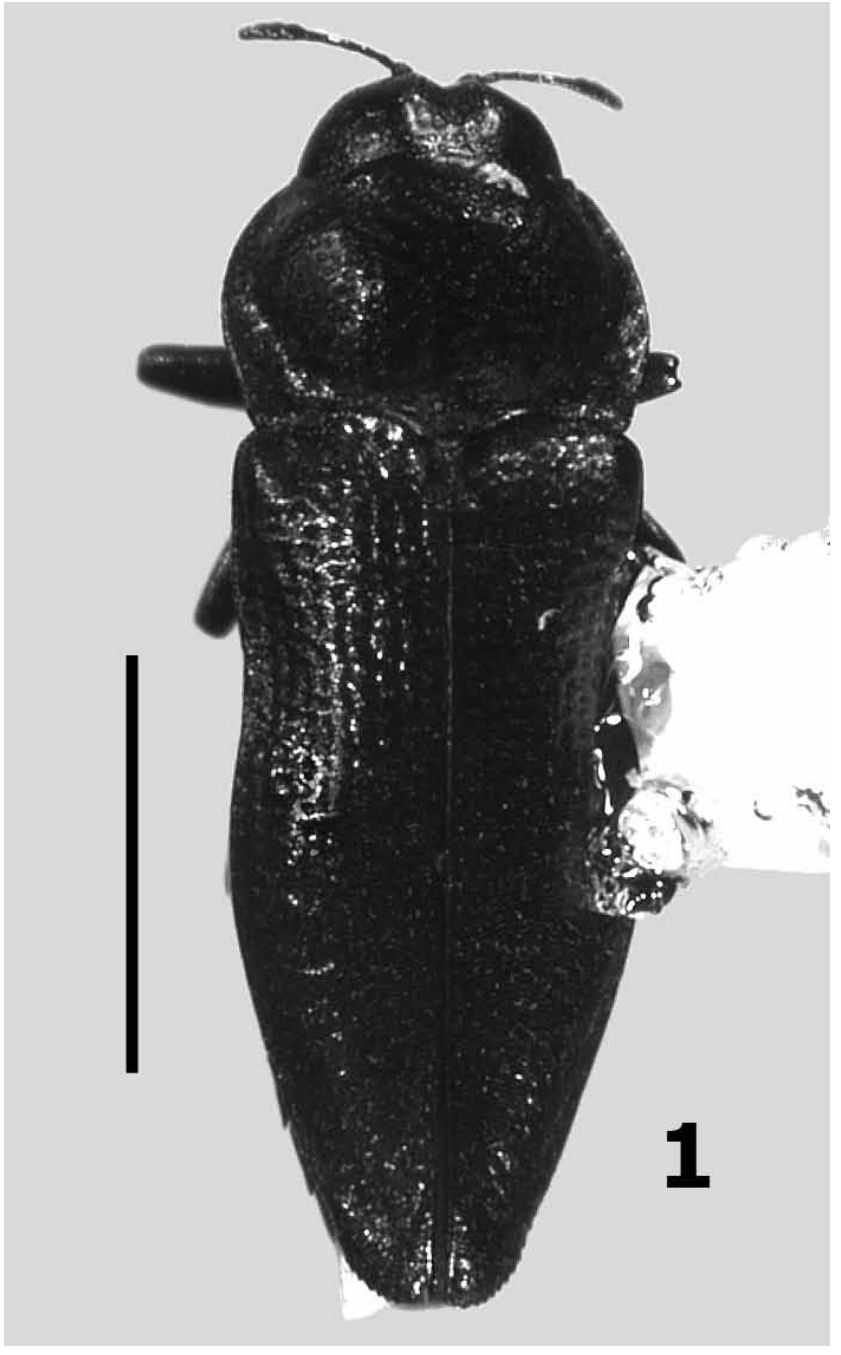
Aphanisticus cochinchinae* ssp. *seminulum Obenberger
(Fig. 1)

Aphanisticus cochinchinae ssp. *seminulum* Obenberger, 1929: 111; Chang & Oto, 1984: 36; Bílý, 1986: 202; Heu, 1987a: 2; 1987b: 7; Wellso & Jackman, 1995: 287; Peck & Thomas, 1998: 67; MacRae & Nelson, 2003: 63.

Diagnostic summary description. Size (maximum length x width): 2.5–3.0 x 0.8–1.0 mm; elongate ovoid, flattened; surface completely black with faint aeneous to purplish reflections; surface sculpture finely rugose-imbricate overall, head and pronotum with large, shallow foveate punctures, elytra with nearly striate large, shallow punctures; head with very narrow groove between very large eyes; frontclypeus very strongly compressed, distal margin strongly arcuate; groove for antennae in repose oblique ventrad eye; antennae short, very narrow, only antennomeres 8-11 expanded; pronotum strongly, convex on median portion of disc; widest at midpoint, elytra very slightly wider posterior to midpoint; scutellum small, very slender triangle, much longer than wide; elytral apicolateral margin finely serrate; anterior prosternal margin angularly concave, process feebly trispinose; abdominal ventrites 1, 2 subequal, longer together than 3+4+5; apical margin of ♀ 5 serrate; legs with femora flattened, subexplanate to cover tibiae and tarsi in repose; tarsal claws simple.

Specimens Examined. FIJI: **Viti Levu:** 1♀ [FBA 517179] Abaca, ca. 9 km SE Lautoka, 1740', S17°40'14" E177°32'38", 15.xi.2005, Bellamy, Lingafelter, Reid, Samuel-

Figure 1. *Aphanisticus cochinchinae* ssp. *seminulum* Obenberger, 1929. Scale bar = 1.0 mm.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son, Tokota'a, sweeping; 1♀ [FBA 517180] Nadarivatu, Emperor Gold Mine, vicinity of guest house, S17°34'28" E177°57'34", 16.xi.2005, same collectors; 3♀ [FBA 517183–517185] South Ridge Radio tower, S17°35'19" E177°55'17", 3350', 16.xi.2005, same collectors; 1♂, 1♀ [FBA 528325–528326] Koro Ni O, north ridge, NW of Nadarivatu, 1028 m, S17°34'32" E177°58'02", 18.i.2006, S.D. Gaimari; FIJI: **Vanua Levu:** 1♀ [FBA 145967] Batigere Range, 6 km NW Kilaka Village, 98 m, 28.VI.–21.VII.2004, Malaise 5, Schlinger, Tokota'a, 16.807°S, 178.991°E; 1♀ [FBA 528327] Vatudiri, 4 km SE Lomatoma, 630 m, 16°37'48"S, 179°12'29"E, 25.i.2006, S.D. Gaimari; FIJI: **Kadavu:** 1 ♀ [FBA 528328] Vunisea Airport, 0–5 m coastal veg., beating, 25.xi.2005, C. Reid, on grass (**new country records**). These specimens will be deposited in FNIC, BPBM, CSCA, and CLBC.

Comments. This small, black beetle represents the first record of this genus in Fiji. Considering the apparent original introduction into sugarcane fields in Hawai'i took place in the 1980s (Chang & Oto, 1984; Heu, 1987a) but not identified until several years later (Bílý, 1986; Heu, 1987b), the spread into similar habitats in South Pacific islands and economies where sugarcane is grown is not surprising considering how far it has already spread into Latin America. One of the Fijian specimens was sent to Dr. Svatopluk Bílý, NMPC, who provided the original identification for the Hawaiian specimens by comparing it to the type housed in the Obenberger collection and he has confirmed this identification.

Genus *Endelus* Deyrolle

Endelus Deyrolle, 1864: 227; Théry, 1932: 1; Obenberger, 1937: 1277; Bellamy, 2003: 92. Type species: *Endelus cupido* Deyrolle, 1864 (fixed by subsequent designation: Cobos, 1979: 427).

Comments. Several of the character states repeated in the species descriptions below are likely to be generic level characters. I have not studied this genus in more detail nor species from other parts of the general range and there is no need to write a revised genus-level description now. Kalashian (1997) proposed a second subgenus of *Endelus*: *E.* (*Kubaniellus*) for species from China and Vietnam. The Fijian species all belong to the nominate subgenus.

There is a general impression, perhaps only anecdotal, that species of *Endelus* are associated with ferns. I've seen specimens of *Endelus* spp. labeled "on ferns" and I've collected *Endelus* spp. in disturbed habitats of peninsular Malaysia by sweeping ferns. Dr. S. Bílý (pers. comm.) has told me "many specimens of *E. bakerianus* were reared by A.D. Wright from a fern (*Lygodium microphyllum*) and an additional unidentified *Endelus* sp. from *Nephrolepis biserrata* from Thailand. I collected a few specimens of *E. cupido* from unidentified fern in Sarawak." These specimens are in NMPC. The literature on the ferns of Fiji is not specific about insect associates and exists only as a summary flora (Parham, 1972) or one specific work (Brownlie, 1977). In the work by Parham (1972), the account of 'Filicopsida' summarizes some 282 species placed in 16 families, including five mostly terrestrial fern groups: Aspidiaceae, Aspleniaceae, Blechnaceae, Cyatheaceae and Pteridaceae. From such a vast flora of potential host plants, much more focused and specific collecting will be required to demonstrate the host plants of the species of *Endelus* discussed herein.

KEY TO THE SPECIES OF *ENDELUS* OF FIJI

1. Dorsal coloration: vertex and pronotum shining red cupreous, elytra green with cupreous punctures (Fig. 6) ... (Tavueni) ..... **E. cupreoviridis** Bellamy, **sp. nov**.
–. Dorsal coloration otherwise, various colors black, cupreous and with some type of elytral pattern 2

2. Elytra with alternating surface sculpture creating pattern of concentric rings with central spot in anterior half and several parallel "zig zag" fasciae in posterior half (Figs. 2,3) ... (Kioa, Ovalau, Vanua Levu, Viti Levu) ..... **E. speculifer** Théry
–. Elytra without complicated pattern although disc and lateral portions having different surface sculpture 3

3. Dorsal surface shining cupreous, darker so on head, pronotal and elytral discs; brighter with more dense punctation laterally on pronotum and elytra (Fig. 5) ... (Viti Levu) ..... **E. cupreocingulatus** Bellamy**, sp. nov**.
–. Dorsal surface darker, surface black to brown with cupreous pattern on lateral portions of pronotum and elytra 4

4. Body slightly more slender, dorsal coloration more coppery on head, pronotum and perimeter of elytra; overall appearance of body smooth, less punctate (Fig. 4) ... (Kadavu, Viti Levu) ..... **E. fijiensis** Bellamy**, sp. nov**.
–. Body slightly more robust, dorsal coloration more somber, only a slight difference in surface sculpture appearance from disc; overall appearance of body more punctate (Fig. 7) ... (Vanua Levu) ..... **E. castaneocupreus** Bellamy**, sp. nov**.

Endelus* (*Endelus*) *speculifer Théry
(Figs. 2, 3)

Endelus speculifer Théry, 1932: 10; Obenberger, 1937: 1283; Bellamy, 1990: 91.
Endelus bicolor, Bellamy, 1990: 89., **Syn. nov.**

Description of holotype of *E. bicolor* [verbatim from Bellamy (1990: 89–91)]. *Diagnosis*. Size (maximum length x width): 4.0 x 1.6 mm; elongate ovoid, flattened; colour of head, middle of pronotum and some nearly glabrous portions of the elytral disc dark cupreous; laterla portion of pronotum and some of elytral disc moderately shagreened, appearing brighter cupreous; remaining elytral surface shagreened with deep blue reflection; underside and legs very dark, nearly black; surface irreguarly covered with large shallow punctures. *Head*: frontovertex deeply excavata between widely separated eyes; eyes large, inner margins slightly diverging dorsally; median longitudinal groove of frontovertex with a single fovea at either end, distal end of groove confluent with supra-antennal grooves wich extend laterally, on either side, almost to inner margin of eye; frontoclypeus longitudinally depressed, narrowed between antennal cavities; disc of clypeus a nearly ventrally facing inverted "Y", distal margin roundly emarginate; labrum not visible; genal scrobe beneath each eye; *Antennae*: antennomere 2 globose; 3 narrower, shorter than 2; 4 shorter than 3; 5 subserrate; 6–10 serrate. *Pronotum*: nearly 2 x wider than long, widest at middle; anterior margin very slightly arcuate at middle; basal margin bisinuate on either side of narrow truncate prescutellar lobe: basal angles obtuse, rounded; lateral margins widening in an arc to widest point, then arcuately rounded to anterior margin; disc strongly gibbous in middle, on anterior 2/3, width of swollen portion of disc slightly narrower than head; remainder of pronotum flattened, explanate laterally. *Scutellum*: nearly an equilateral triangle; disc slightly depressed behind anterior margin. *Elytra*: slightly wider than pronotum opposite prominent humeri; one slight depression on either side between humerus and scutellum; basal angles rounded; lateral margins straight for short distance past humeri, narrowing slightly to

Figures 2–7. *Endelus* (*Endelus*) spp., dorsal habitus. **2**, *E. speculifer* Théry, holotype; **3**, *E. bicolor* Bellamy, holotype; **4**, *E. fijiensis*, sp. nov., holotype; **5**, *E. cupreocingulatus*, sp. nov., holotype; **6**, *E. cupreoviridis*, sp. nov., holotype; **7**, *E. castaneocupreus*, sp. nov., holotype. Scale bars = 1.0 mm.

before middle, then widening before becoming gradually attenuate prior to nearly rectangular, serrate apicolateral angels; margins carinate, separating epipleuron and disc from base to opposite 2nd abdominal sternite; sutural margins with feebly elevated costae; disc flattened with slight depressions and swellings, steeply declivous past humeri to middle laterally. *Underside*: prosternum short, wide, process between procoxae, apex triangular; metepimeron hidden beneath epipleuron; metacoxal plate with posterior margins strongly arcuately emarginate; abdominal sternies with suture between 1 and 2 only indicated laterally; length of 1 + 2 nearly 1.5 x as long as 3 + 4 + 5; 5 with submarginal groove extending around entire perimeter, broadest apically. *Legs*: femora fusiform, pro- and mesofemora flattened, posterior margin explanate dorsoventrally to hide tibiae and tarsi in repose; metafemora roundly fusiform, metatibiae and tarsi free in repose; metatibiae with setal comb on distal half of dorsal side; tarsomeres 1–4 short, each with pulvillus; 1–4 shorter together than 5; 5 narrow, elongate, claws swollen basally, tips widely separated.

Variation. The holotype of *E. speculifer* is 3.2 x 1.2 mm; the two female paratypes vary slight in size: 3.7–3.9 x 1.4–1.6 mm but otherwise agree in all other aspects to the holotype. One additional specimen varies in size: 4.1 x 1.8 mm.

Specimens examined: Holotype of *E. speculifer* (gender unknown) (MNHN): Museum Paris (p), Ovalau (h), Collection Léon Fairmaire 1906 (p)/ Endelus speculifer Frm. Ovalau L. Fairmaire det. (h)/ Exemplaire dessine (p)/ TYPE (red card, p)/ Muséum Paris, Coll. générale (p); holotype of *E. bicolor* ♀ (BPBM 14174) from FIJI: **Vanua Levu**: Tabia (Thakaundrove), 0–2m, 5.X.1979 (p)/ 214 (h)/ S.N. Lal, G.A. & S.L. Samuelson Colls., BISHOP Museum Acc. No. #1979.387 (p); 1 ♀ paratype **Viti Levu**: Naduruloulou, 0–25m, 26.IX.1979 (p)/ ferns (p)/ G.A. Samuelson Coll. BISHOP Museum Acc. #1979.380 (p) (BPBM); 1 ♀ paratype **Kioa**: S coast to center, 0–60 m, 4.X.1979 (p)/ M.K. Kamath, S.N. Lal, G.A. & S.L. Samuelson Colls., BISHOP Museum Acc. #1979.387 (p) (CLBC); 1 spm, **Viti Levu**: Naitasiri Prov., Navai Village, Eteni. FJ-11a. Malaise, 15.V–2.VI.03, M. Irwin, E. Schlinger, M. Tokota'a, 17°37'S, 177°59'E, 700 m, [FBA 041819] (FNIC).

Fiji Distribution: Kioa Island, Ovalau, Vanua Levu, Viti Levu

Comments. As the labels and the original description indicate, *E. speculifer* was a Fairmaire manuscript name, finally described many years later by Théry. My identification of this species from specimens in the BPBM collection (Bellamy 1990) was wrong. Having the unique holotype before me in comparison to the type series of *E. bicolor* Bellamy, 1990, I find that these two species are very close, but they do differ in several ways. Having only the holotype of *E. speculifer* and the four specimens of *E. bicolor*, I believe that these specimens are conspecific. Although there is some geographical separation between these five specimens and some slight morphological divergence, proposing this synonymy now. The holotype of *E. speculifer* is more slender and the dorsal coloration less intense than of *E. bicolor*.

Endelus* (*Endelus*) *fijiensis Bellamy**, sp. nov.**

(Fig. 4)

Description of holotype (♂). *Diagnosis*. Size (maximum length x width): 3.4 mm x 1.3 mm, widest opposite humeri; elongate ovoid, slender, flattened above, transversely convex; body black with varied shining cupreous reflections on frontovertex, pronotum, around lateral and distal portions of elytra; ventral surface nitid black with no cupreous reflections; surface of head, pronotum and ventral surface very finely imbricate with irregular large, very shallow belt-buckle setae; elytral surface finely imbricate and sparsely foveolate, each small fovea with single, stout, adpressed seta; ventral surface with fine partially recumbent short white setae in median portion of thoracic and abdominal ventrites. *Head*: strongly, longitudinally depressed between two angulate projections that bear the eyes, when viewed from above, angle of frontovertex depression obtuse; anterior-most portion of longitudinal groove between eyes with one deep, circular pit; eyes relatively large, inner margins slightly diverging dorsally, without circumocular groove, but with four small deep pits on either side along inner margin around ventral portion of eye; frons with two small nearly transverse elevations above antennal cavities, on either side of pair of deep, circular pits; frontoclypeus narrowed between antennae, width less than that of antennal cavity, then widening strongly to very wide, partially ventrally declivous straight distal margin; antennal cavities each arcuate laterally, confluent with short, oblique genal depression to receive basal antennomeres in repose; antennae short, antennomere 1 slightly longer, partially recurved, slightly longer than 2, 2 slightly wider than 1, 3 and 4 shorter, more slender than 2, 4 shorter than 3, 5 expanded distally, slightly longer than 4, 6 broadly triangular, 7–9 subequal, each much wider than long, subrectangular, 10 subequal to 9, 11 oblong. *Pronotum*: 2.26 times wider than longer, widest near midpoint of length; anterior margin slightly arcuate on either side of nearly evenly transverse median portion; posterior margin bisinuate on either side of feebly concave median prescutellar lobe; lateral margins evenly arcuate anterior to obtuse lateroposterior angle, mar-

gin finely crenulate; disc flattened in posterior 2/3, anterior 1/3 feebly declivous anteriorally; lateral portion of disc moderately depressed before margin. *Scutellum*: nearly equilateral triangular, only slightly longer than wide; anterior margin feebly convex; lateral margins moderately concave, apex strongly acuminate. *Elytra*: 1.03 times wider than pronotum, widest opposite humeri; one slight broad depression on each elytron just beyond anterior margin, between humeri and suture; disc otherwise feebly transversely convex; sutural margin a slightly elevated costa; lateral margins narrowing gradually posterior to humeri to about anterior 1/4 before widening slightly to midpoint then gradually narrowing to just anterior to separately rounded apices; lateral margins carinate, entire to apicolateral angle then finely serrate. *Underside*: prosternum with anterior margin feebly concave, process broad, widening posterior to procoxae, apex broad, angularly convex apically; metacoxal plate strongly dilated along posterior margin; abdominal ventrite 1 longer than 2, 1+2 longer than 3+4+5; 4 and 5 subequal in length; 5 longer than 4; suture between 1 and 2 only vaguely visible; sutures between 2, 3, 4 and 5 feebly arcuate; 5 with premarginal groove along entire visible perimeter, apex arcuately rounded. *Legs*: femora strongly fusiform, expanded to partially obscure flattened tibiae in repose; tarsi with tarsomeres 1–4 each very short, each with progressively longer ventral pulvillus; 5 elongate, slender, as long as 1–4 together; each claw with stout basal appendix. *Genitalia*: not dissected.

Variation. Five unsexed paratypes differ from the holotype: size (maximum length x width): 3.4–3.9 mm x 1.5–1.7 mm; there are slight difference in the brightness of the dorsal color but this is possibly an artifact either of age or preservation.

Etymology. The specific epithet refers to the bright coppery (*cupreus*) ring around (*cingo*) the perimeter (*latitudo*) of the darker coppery elytral disk.

Specimens examined: Holotype ♂ (BPBM 16,722) from FIJI: **Viti Levu**: Nandarivatu (p) IX-10-38, 3700' (h)/ Beating Shrubbery (p)/ ECZimmerman Collector (p); 4 paratypes (1♂, 3♀): same data as holotype (BPBM, CLBC); 1 paratype (♀) FIJI: **Kadavu**: 0.25 km SW Solodamu Vlg. Moanakaka Bird Sanctuary, 4.Sep.–23.Oct.2004 Malaise 3, 60 m, S. Lau, 19.078°S, 178.121°E [FBA 511084] (FNIC).

Fiji Distribution: Kaduvu, Viti Levu.

Comments. This rather drab looking species was first collected in 1938 by Dr. E.C. Zimmerman and the specimens were at the BPBM awaiting further study. This is the species that I misidentified earlier (as *E. speculifer*) when I described *E. bicolor*. It can be distinguished from the Fijian congeners as indicated above in the key yet comes nearest to *E. castaneocupreus* sp. nov. and is separated from that species by character states discussed under than species below.

Endelus* (*Endelus*) *cupreocingulatus Bellamy**, sp. nov.**
(Fig. 5)

Description of holotype (sex?). *Diagnosis*. Size (maximum length x width): 3.6 mm x 1.5 mm, widest opposite humeri; elongate ovoid, slender, flattened above, transversely convex; entire dorsal surface shining cupreous, ventral surface nitid black; varied surface sculpture on pronotum and elytra results in mostly in lateral portions having a frosted appearance; surface of head, pronotum and ventral surface very finely imbricate with irregular large, very shallow belt-buckle setae; elytra with varied surface sculpture forming pattern (Fig. 4), overall sparsely foveolate, each small fovea with single, stout, adpressed seta; median portion of disc mostly glabrous; remaining portions of disc punctulate-reticulate. *Head*: strongly, longitudinally depressed between two angulate projections that bear the eyes, when viewed from above, angle of frontovertex depression obtuse; anterior-most portion of longitudinal groove between eyes with one deep, circular pit; eyes relatively large, inner margins slightly diverging dorsally, without circumocular groove, but with four small deep pits on either side along inner margin around ventral portion of eye; frons with two small nearly transverse eleva-

tions above antennal cavities, on either side of pair of deep, circular pits; frontoclypeus narrowed between antennae, width less than that of antennal cavity, then widening strongly to very wide, partially ventrally declivous arcuate distal margin; antennal cavities each arcuate laterally, confluent with short, oblique genal depression to receive basal antennomeres in repose; antennae short, antennomere 1 slightly longer, partially recurved, slightly longer than 2, 2 slightly wider than 1, 3 and 4 shorter, more slender than 2, 4 shorter than 3, 5 triangularly serrate, 6 broadly triangular, 7-9 subequal, each much wider than long, subrectangular, 10 subequal to 9, 11 oblong. *Pronotum*: 2.05 times wider than longer, widest near midpoint of length; anterior margin slightly arcuate on either side of nearly evenly transverse median portion; posterior margin angularly bisinuate on either side of straight median prescutellar lobe; lateral margins evenly arcuate anterior to subobtuse lateroposterior angle, margin finely crenulate; disc flattened in posterior 2/3, anterior 1/3 slightly declivous anteriorally; lateral portion of disc moderately depressed before margin. *Scutellum*: nearly equilateral triangular, feebly longer than wide; anterior margin feebly concave; lateral margins moderately concave, posterior apex strongly acuminate. *Elytra*: 1.12 times wider than pronotum, widest opposite humeri; one slight broad depression on each elytron just beyond anterior margin, between humeri and suture; disc otherwise feebly transversely convex; sutural margin a slightly elevated costa; lateral margins narrowing very gradually posterior to humeri to about anterior 1/4 before widening slightly to midpoint then gradually narrowing to just anterior to apex, then slightly more straight before separately rounded apices; lateral margins carinate, entire until just before apex, then finely serrate. *Underside*: prosternum with anterior margin feebly concave, process broad, widening posterior to procoxae, apex broad, angularly convex apically; metacoxal plate strongly dilated along posterior margin; abdominal ventrite 1 longer than 2, 1+2 longer than 3+4+5; 4 and 5 subequal in length; 5 longer than 4; suture between 1 and 2 only vaguely visible; sutures between 2, 3, 4 and 5 feebly arcuate; 5 with premarginal groove along entire visible perimeter, apex broadly arcuately rounded. *Legs*: femora strongly fusiform, expanded to partially obscure flattened tibiae in repose; tarsi with tarsomeres 1–4 each very short, each with progressively longer ventral pulvillus; 5 elongate, slender, as long as 1–4 together; each claw with very feeble basal lobe. *Genitalia*: not dissected.

Variation. Two unsexed paratypes differ from holotype: size (maximum length x width): 3.4–3.5 mm x 1.3–1.4 mm; there are slight difference in the brightness of the dorsal color but this is possibly an artifact either of age or preservation.

Etymology. Named for the country of origin.

Types: Holotype (♂) from FIJI: **Viti Levu:** Ocean Pacific, Wainadoi. FJ-18 Malaise, 5.XI–24.XI.03, M. Irwin, E. Schlinger, M. Tokota'a, 18°10'S, 178°15'E, 40 m [FBA 050502]; 1 ♀ paratype (FNIC, FBA 050503) with same data except FBA 050502; 1 paratype (♀) FIJI: **Viti Levu:** 4 km WSW Colo-i-Suva Village, Mt. Nakobalevu, 372 m, 9–30.V.2003, Malaise 4, E. Schlinger, M. Tokota'a. 18.055°S, 178.424°E. [FBA 164010] (BPBM). Holotype to be deposited in FNIC.

Fiji Distribution: Viti Levu

Comments. This beautiful coppery species differs the other Fijian *Endelus* spp. with the bright coppery perimeter to the elytra.

Endelus* (*Endelus*) *cupreoviridis Bellamy**, sp. nov.**

(Fig. 6)

Description of ♂ holotype. *Diagnosis*. Size (maximum length x width): 3.7 mm x 1.4 mm, widest opposite humeri; elongate ovoid, slender, flattened above, transversely convex; vertex and pronotum shining red cupreous, elytra bright dark green with each large puncture on elytral disc the same color as the pronotum; surface of vertex and pronotum very finely rugulose-strigulate with large, very shallow belt-buckle setae; frons finely imbricate with sparse irregular punctures; elytra finely rugulose and puncticulate, each shallow puncture with short, recumbent seta; ventral surface rugulose to fine-

ly imbricate and with large, shallow belt-buckle setae. *Head*: strongly, longitudinally depressed between two angulate projections that bear the eyes, when viewed from above, angle of frontovertex depression slightly obtuse; anterior-most portion of longitudinal groove between eyes with one deep, circular pit; eyes relatively large, inner margins slightly diverging dorsally, without circumocular groove, but with four small deep pits on either side along inner margin around ventral portion of eye; frons with two small nearly transverse elevations above antennal cavities, on either side of pair of deep, circular pits; frontoclypeus narrowed between antennae, width less than that of antennal cavity, then widening strongly to very wide, partially ventrally declivous distal clypeal margin; antennal cavities each arcuate laterally, confluent with short, oblique genal depression to receive basal antennomeres in repose; antennae short, antennomere 1 slightly longer, partially recurved, more robust than 2, 3 subequal to 2, but more slender, 4 shorter than 5, 6–10 serrate, triangularly to oblong laterally, 11 oblong. *Pronotum*: 2.08 times wider than longer, widest near midpoint of length; anterior margin slightly arcuate on either side of nearly evenly transverse median portion; posterior margin angularly bisinuate on either side of feebly emarginate median prescutellar lobe; lateral margins evenly arcuate anterior to nearly right angled lateroposterior angle, margin finely crenulate; disc flattened in posterior 2/3, anterior 1/3 slightly declivous anteriorally; lateral portion of disc slightly depressed before margin. *Scutellum*: elongate triangular, longer than wide; anterior margin feebly concave; lateral margins moderately concave, posterior apex strongly acuminate. *Elytra*: 1.13 times wider than pronotum, widest opposite humeri; one slight broad depression on each elytron just beyond anterior margin, between humeri and suture; disc otherwise feebly transversely convex; sutural margin a slightly elevated costa; lateral margins narrowing very gradually posterior to humeri to about anterior 1/4 before widening slightly to midpoint then gradually narrowing to just anterior to apex, then slightly more straight before separately rounded apices; lateral margins carinate, entire until just before apex, then finely serrate. *Underside*: prosternum with anterior margin feebly concave, process broad, widening posterior to procoxae, apex broad, angularly convex apically; metacoxal plate strongly dilated along posterior margin; abdominal ventrite 1 longer than 2, 1+2 longer than 3+4+5; 4 and 5 subequal in length; 5 longer than 4; suture between 1 and 2 only vaguely visible; sutures between 2, 3, 4 and 5 feebly arcuate; 5 with premarginal groove along entire visible perimeter, apex broadly arcuately rounded. *Legs*: femora strongly fusiform, expanded to partially obscure flattened tibiae in repose; tarsi with tarsomeres 1–4 each very short, each with progressively longer ventral pulvillus; 5 elongate, slender, as long as 1–4 together; each claw with angulate basal appendix. *Genitalia*: partially exerted, but not dissected.

Variation. One ♀ paratype differs from the holotype as follows: 3.9 mm x 1.4 mm, the red coppery color of the vertex and pronotum is brighter.

Etymology. The species name refers to the cupreous vertex and pronotum and the green eltyra.

Types: Holotype ♂ from FIJI: **Taveuni**, 5.6 km SE Tavuki Village, Devo Peak, 1187 m, 11 Feb.–22 Mar.2005, Malaise 1, P. Vodo, 16.843°S, 179.960°W [FBA 511081]; Paratype ♀ from FIJI: **Taveuni**: Devo Forest Reserve, 3.I–10.I.2003, FJ-9 malaise, M. Irwin, E. Schlinger, M. Tokota'a, 179°59'E 16°50'S, 800 m [FBA 012084] (BPBM). Holotype to be deposited in FNIC.

Fiji Distribution: Taveuni Island.

Comments. This species is immediately distinguished from the other Fijian congeners due to the dorsal coloration.

Endelus* (*Endelus*) *castaneocupreus Bellamy**, sp. nov.**

(Fig. 7)

Description of holotype (♀). *Diagnosis*. Size (maximum length x width): 3.2 mm x 1.3 mm, widest opposite humeri; elongate ovoid, slender, flattened above, transversely convex; body black with

opaque cupreous reflections on frontovertex, pronotum, around lateral and distal portions of elytra; ventral surface nitid black with no cupreoaeneous reflections; surface of head and pronotum very finely rugose imbricate with irregular large, very shallow belt-buckle setae; elytral surface finely imbricate and sparsely foveolate, each small fovea with single, stout, adpressed seta; ventral surface with broad, scalloped imbrications and without any visible vestiture at high magnification. *Head*: strongly, longitudinally depressed between two angulate projections that bear the eyes, when viewed from above, angle of frontovertex depression obtuse; anterior-most portion of longitudinal groove between eyes with one deep, circular pit; eyes relatively large, inner margins slightly diverging dorsally, without circumocular groove, but with four small deep pits on either side along inner margin around ventral portion of eye; frons with two small nearly transverse elevations above antennal cavities, on either side of pair of deep, circular pits; frontoclypeus narrowed between antennae, width less than that of antennal cavity, then widening strongly to very wide, partially ventrally declivous straight distal margin; antennal cavities each arcuate laterally, confluent with short, oblique genal depression to receive basal antennomeres in repose; antennae short, antennomere 1 slightly longer, partially recurved, slightly longer than 2, 2 slightly wider than 1, 3 and 4 shorter, more slender than 2, 4 shorter than 3, 5 expanded distally, slightly longer than 4, 6 broadly triangular, 7–9 subequal, each much wider than long, subrectangular, 10 subequal to 9, 11 oblong. *Pronotum*: 2.17 times wider than longer, widest near posterior 1/3 of length; anterior margin slightly arcuate on either side of nearly evenly transverse median portion; posterior margin bisinuate on either side of feebly concave median prescutellar lobe; lateral margins evenly arcuate from posterior 1/3 to anterior margin, slightly concave from obtuse lateroposterior angle to posterior 1/3; margin finely crenulate; disc flattened in posterior 2/3, anterior 1/3 feebly declivous anteriorally; lateral portion of disc strongly depressed before margin. *Scutellum*: nearly equilateral triangular, only slightly longer than wide; anterior margin feebly convex; lateral margins moderately concave, apex acuminate. *Elytra*: 1.01 times wider than pronotum, widest opposite humeri; one slight broad depression on each elytron just inside anterior margin, between humeri and suture; humeri moderately elevated, oblique; disc otherwise feebly transversely convex; sutural margin a slightly elevated costa; lateral margins narrowing gradually posterior to humeri to about anterior 1/4 before widening slightly to midpoint then gradually narrowing to just anterior to separately rounded apices; lateral margins carinate, entire to apicolateral angle then finely serrate. *Underside*: prosternum with anterior margin feebly concave, process broad, widening posterior to procoxae, apex broad, angularly convex apically; metacoxal plate strongly dilated along posterior margin; abdominal ventrite 1 longer than 2, 1+2 longer than 3+4+5; 4 and 5 subequal in length; 5 longer than 4; suture between 1 and 2 only vaguely visible; sutures between 2, 3, 4 and 5 feebly arcuate; 5 with premarginal groove along entire visible perimeter, apex arcuately rounded. *Legs*: femora strongly fusiform, expanded to partially obscure flattened tibiae in repose; tarsi with tarsomeres 1–4 each very short, each with progressively longer ventral pulvillus; 5 elongate, slender, as long as 1–4 together; each claw with stout basal appendix. *Genitalia*: not dissected.

Variation. Only known from the holotype.

Etymology. The specific epithet refers to the dorsal coloration, a mixture of shades of chesnut-brown (*castaneus*) and coppery (*cupreous*).

Types: Holotype (♀) from FIJI: **Vanua Levu:** Batigere Range, 6 km NW Kilaka Village, 98 m, 28.VI.–21.VII.2004, Malaise 5, E. Schlinger, M. Tokota'a, 16.807°S, 178.991°E [FBA 145966]. Holotype to be deposited in FNIC.

Fiji Distribution: Vanua Levu.

Comments. This new species comes nearest to *E. fijiensis*, sp. nov., but differs in the general body proportion being more robust that *E. fijiensis*, sp. nov. and the dorsal coloration and pattern are very different. *E. castaneocupreus*, sp. nov. is only known from Vanua Levu while *E. fijiensis*, sp. nov. is know from Viti Levu and Kadavu.

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I first thank Neal Evenhuis, BPBM for including me in the beetle constituency of the Fiji Arthopod project; Al Samuelson, Chris Reid, Steve Lingafelter and Moala Tokota'a for the interesting and entertaining two week field trip companionship in November 2005; again to Al for so many favors over the years; to Dr. Svatopluk Bílý, National Museum, Prague, Czech Republic for confirming the identification of *Aphanisticus cochinchinae* ssp. *seminulum*; to Dr. T. Deuve, Isabelle Bruneau de Miré, Museum National d'Histoire Naturelle, Paris, France for sending the type of *Endelus speculifer*; to Scott Kinnee of the PPDC lab of CDFA in Sacramento for his help with the illustrations used herein; to Shepherd Myers, BPBM Entomology for locating and making the loan of additional specimens used herein and for use in future papers on the Fijian Buprestidae; and to the Fiji Government (Ministries of Forestry and Environment) for their continued support of the project.

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Revision of Fijian *Tomosvaryella* Aczél (Diptera: Pipunculidae)

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Abstract: The Fijian species of *Tomosvaryella* Aczél, 1939 are revised and include three new species: *T. cagiae* **n. sp.**, *T. corusca* **n. sp.** and *T. moala* **n. sp.**. Keys to Fijian Pipunculidae genera and to *Tomosvaryella* species are provided and diagnostic characters, including male and female genitalia, are illustrated.

INTRODUCTION

This is the second in a series of papers that ultimately aims to document the diversity of all Fijian Pipunculidae. The first paper documented the taxonomy and phylogeny of *Collinias* Aczél, 1940 (Skevington, 2006). Until the recent inventory of Fijian invertebrates, *Collinas vitiensis* Muir, 1906, was the sole representative of the Fijian pipunculid fauna (named from two pipunculid specimens). From recent collecting efforts, we now know that over 25 species in seven genera (see the key below) are supported by a collection of 2129 specimens (Skevington, unpubl. data). The bulk of the family's diversity occurs in the genus *Clistoabdominalis* and almost all Fijian pipunculid species are endemic.

Tomosvaryella is a diverse, globally distributed pipunculid genus containing 271 described species (De Meyer, 1996; De Meyer & Skevington, 2000). As far as is known from the few available rearing records, *Tomosvaryella* are endoparasitoids of leafhoppers and planthoppers belonging to the following lineages: Auchenorrhyncha: Cicadellidae: Cicadellinae, Deltocephalinae, and Hecalinae and Delphacidae (Kapoor *et al*., 1987; Skevington & Marshall, 1997). *Tomosvaryella* occurs throughout most of the south Pacific, including the islands of New Caledonia and New Zealand. They are abundant and diverse in Australia (unpublished data) and are absent from some small islands and Hawaii (De Meyer, 1996; De Meyer & Skevington, 2000). The Fijian species of *Tomosvaryella* appear to be most closely related to New Caledonian species, but description of many more Oceanian species and a regional phylogeny are required before this hypothesis can be tested.

MATERIALS AND METHODS

Specimens examined are deposited in BPBM (Bishop Museum, Honolulu, Hawai'i, USA), CNC (Canadian National Collection of Insects, Ottawa, Ontario, Canada), FNIC (Fiji National Insect Collection, Suva, Fiji) and HNHM (Hungarian Natural History Museum, Budapest, Hungary) (abbreviations follow Evenhuis & Samuelson (2007)).

1. Contribution No. 2007-010 to the NSF-Fiji Arthropod Survey.

Specimen preparation follows Skevington (2003). Photographs were taken though a Leica DM550B compound microscope, through a Leica MZ16, and through a Canon EOS 10D camera equipped with a 65 mm macro. In most cases, Leica Application Suite (LAS) was used to create a montage from multiple layers of photographs. Measurements were made using a graticule. Scale bars on the figures are all 0.1 mm. If available, at least five specimens were used from each species to obtain the recorded values.

All specimens are labeled with a unique reference number, in the format J. Skevington Specimen # *n*, CNC Diptera # *n* or FBA *n*. These have been shortened to follow the format JSS*n*, CNCD*n*, and FBA*n* respectively throughout the text. These numbers are used in a database of Pipunculidae specimens that JHS maintains (available upon request) and in the Fijian Arthropod Database (http://www.inhs.uiuc.edu/cee/fijimandala/). Material examined is listed in order of increasing latitude within islands. Islands are organized alphabetically. Where square brackets are used in the material examined list, they enclose inferred data or notes that are not present on specimen labels. Species are described in alphabetical order.

Terminology and measurements are the same as those used by Skevington (2003, 2005). Genitalic terminology nomenclature follows Sinclair (2000) and is discussed by Skevington & Yeates (2001) with specific reference to Pipunculidae. For a recent summary of these items, see Skevington (2006).

TAXONOMY

Tomosvaryella Aczél

Tomosvaryella Aczél, 1939: 22. Type species: *Pipunculus sylvaticus* Meigen, 1824, by original designation.

Tomosvaryella is closely related to *Dorylomorpha* Aczél within the tribe Tomosvaryellini (Rafael & De Meyer, 1992). A combination of characters serves to diagnose *Tomosvaryella*: dorsocentral rows of hairs on prescutum and scutum with longer hairs anteriorly, third costal section of wing very short, pterostigma absent, cross vein r-m usually close to middle of discal cell (rarely more basal) (Rafael & De Meyer, 1992). A key to the world genera of Pipunculidae is available in Skevington & Yeates (2001) and a key to Fijian genera is available below. A key to the three Fijian species of *Tomosvaryella* is included below. One of the species is truly spectacular. It is one of only two metallic blue species of Pipunculidae known from anywhere in the world [the only other metallic blue species described is *Tomosvaryella caerulescens* De Meyer (1993)].

Key to Fijian Pipunculidae Genera

After several years of collecting via the Fiji Arthropod Survey we now have a good idea of generic level pipunculid diversity in Fiji. Although seven genera occur, several widely distributed genera such as *Eudorylas* Aczél, and *Cephalops* Fallén, are surprisingly absent. The following key is modified from Skevington & Yeates (2001) to allow for easy identification of the seven Fijian genera. Illustrations are not likely to be needed; refer to Skevington & Yeates (2001) if in doubt. Refer to the world key (Skevington & Yeates, 2001) if specimens do not run cleanly through this key. Despite recent intensive collecting efforts, there is still a chance that other genera may be discovered in the islands.

1. Ocellar bristles distinct; occiput very narrow, scarcely projecting behind eyes; head hemispherical; margin of mesonotum and scutellum with strong bristles; wing venation incomplete, cell m open, cross vein dm-cu absent, vein M reduced. Chalarinae ..... **Chalarus** Walker

–. Ocellar bristles reduced or absent; occiput swollen and plainly visible in lateral view; head *spherical*; margin of mesonotum and scutellum without strong bristles; wing venation complete, cell m closed, cross vein dm-cu present, vein M developed ... (Pipunculinae) 2

2. Propleuron with a fan of setae 3

—. Propleuron bare 5

3. Frons not swollen; face not narrowed; discal medial cell expanded medially; vein M_2 present ... (Cephalopsini) ..... **Cephalosphaera** Enderlein

—. Frons swollen; face narrowed; discal medial cell not expanded medially; vein M_2 absent ... (Microcephalopsini) 4

4. Third costal section with additional cross vein; colourful flies with at least tergites 1-3 entirely yellow, often most of abdomen yellow ..... **Collinias** Aczél

—. Third costal section without additional cross vein; abdomen never extensively yellow, tergites 1–3 mostly to entirely brown or black ..... **Microcephalops** De Meyer

5. Wing without coloured pterostigma (Fig. 5C); cross-vein r-m usually situated at about middle of cell M (Fig. 5A) ... (Tomosvaryellini) ..... **Tomosvaryella** Aczél

—. Wing with coloured pterostigma ... (Eudorylini) 6

6. Membranous area on syntergosternite 8 of males absent; syntergosternite 8 swollen, wider than tergite 5; lateral fan of setae absent or minuscule on tergite 1..... ..... **Clistoabdominalis** Skevington

—. Membranous area on syntergosternite 8 of males present; syntergosternite 8 no wider than tergite 5; lateral fan of setae present and well developed on tergite 1 .... **Dasydorylas** Skevington

Key to Fijian *Tomosvaryella*

1. Abdomen shining metallic blue and purple (Fig. 3B); femora and tibiae black (Figs. 3A, C) ..... **Tomosvaryella corusca** Skevington & Földváry**, n. sp**.

–. Abdomen shining black, at most vaguely shining greenish (Figs. 1B, 5B); femora and tibiae bright yellow (Figs. 1A–C, 5A–C)..... 2

2. Tergite 1 with 4–6 long lateral, yellowish hairs; male sternite 4 with posteromedial protuberance bearing dense brush of small setae (visible without dissection) (Fig. 2I); surstyli expanded medially and distally (Fig. 2B); phallic guide with tip angled down at less than 30 degrees in lateral view (Fig. 2G); female frons with ventral third silver-pubescent, middle third brown-pubescent, upper third glossy to matte black; ovipositor piercer short (OL:PL >1.9:1; B:PL >0.9:1), downcurved (Fig. 2J); ovipositor base brown, with no protuberances (Figs. 1C, 2J) .... **Tomosvaryella cagiae** Skevington & Földváry , **n. sp**.

–. Tergite 1 with 2-3 long lateral, yellowish hairs; male sternite 4 simple (Fig. 6I); surstyli narrower, expanded distally, but not medially (Fig. 6B); phallic guide with tip angled down at 45 degrees in lateral view (Fig. 6G); female frons with ventral half silver-pubescent, upper half glossy black; ovipositor piercer long (OL:PL <1.8:1; B:PL <0.8:1), only slightly downcurved (Fig. 6J); ovipositor base with a single medial protuberance (Figs. 5C, 6J) ..... **Tomosvaryella moala** Skevington & Földváry, **n. sp**.

SPECIES ACCOUNTS

Tomosvaryella cagiae Skevington & Földvári**, new species**
(Figs. 1–2)

Diagnosis. Both sexes: Halter yellow (Figs. 1A, C). Trochanters, femora, tibiae, and tarsi all yellow; all setae yellow with black sockets except for black ctenidial spines on femora (Figs. 1A, C). Tergite 1 with 4–6 long lateral, yellowish hairs. Tergites 2-5 black, mostly shining, appearing greenish at some angles (Figs. 1A–C). **Male:** Sternite 4 with posteromedial protuberance bearing dense brush of small setae (Fig. 2I). Sternite 5 with a pair of swollen structures connected by a chitinized bridge (Fig. 2I). Membranous area occupying over half of syntergosternite. Surstyli yellow; narrow, expanded medially and distally (Fig. 2B). Epandrium with right side only slightly longer than left (Fig. 2A). Phallic guide with tip angled down at less than 30 degrees in lateral view (Fig. 2G). **Female:** Frons with ventral third silver-pubescent, middle third brown-pubescent, upper third glossy to matte black. Ovipositor piercer short, downcurved, 0.91–0.92 mm (Fig. 2J). Ovipositor base mostly brown, with no protuberances (Figs. 1C, 2J).

Description. Lengths: Body: 3.1–3.6 mm; wing: 3.2–3.7 mm.

Male. *Head*. Holoptic. Arista brownish yellow. Flagellum yellow, long acuminate. Pedicel yellowish brown with 2-–3 dorsal bristles and no ventral bristles. Scape brown with no bristles. Labellum and palps yellow. Frons silver-pubescent. Occiput silver-pubescent laterally, sparsely brown-pubescent dorsally.

Thorax. Postpronotal lobe yellow. Scutum black, with sparse brown pruinescence on all except anterolateral corners where replaced with silver (Fig. 1B). Scutellum black with weak posterior setae. Pleuron brown with sparse brown pruinescence (Fig. 1C); subscutellum black with silver pruinescence. Halter yellow.

Legs. Coxae brown; trochanters, femora, tibiae, and tarsi all yellow; all setae yellow except for black ctenidial spines on fore and mid femora (Figs. 1A, C). Pale hairs on distal half of posterior side of hind femur as long as the width of tibia at tip; hairs on basal half are half as long. Trochanters simple (no spines or protuberances).

Wing. Fourth costal section about 2–3 times as long as third, C_4:C_3 1.7–3.3:1; R-M situated near middle of discal medial cell (dm), S_3:S_2 1.1–1.2:1. Most of wing uniformly microtrichose except as follows: cell c bare on proximal half to two thirds, sc bare, r_1 bare in proximal third, br bare on proximal quarter to half, bm bare except near distal corner, cup and a_1 bare on proximal half to two thirds.

Abdomen. Tergite 1 silver pruinescent with 4–6 long lateral, yellowish hairs. Tergites 2–5 black, mostly shining, appearing greenish at some angles (Figs. 1A–C). Sternites 1–5 and 7 black. Sternite 6 brownish. Sternite 4 with posteromedial protuberance bearing dense brush of small setae (Fig. 2I). Sternite 5 with a pair of swollen structures connected by a chitinized bridge (Fig. 2I). Syntergosternite 8 black. Membranous area present, occupying over half of syntergosternite.

Male genitalia. Surstyli yellow, nearly symmetrical; narrow, expanded medially and distally

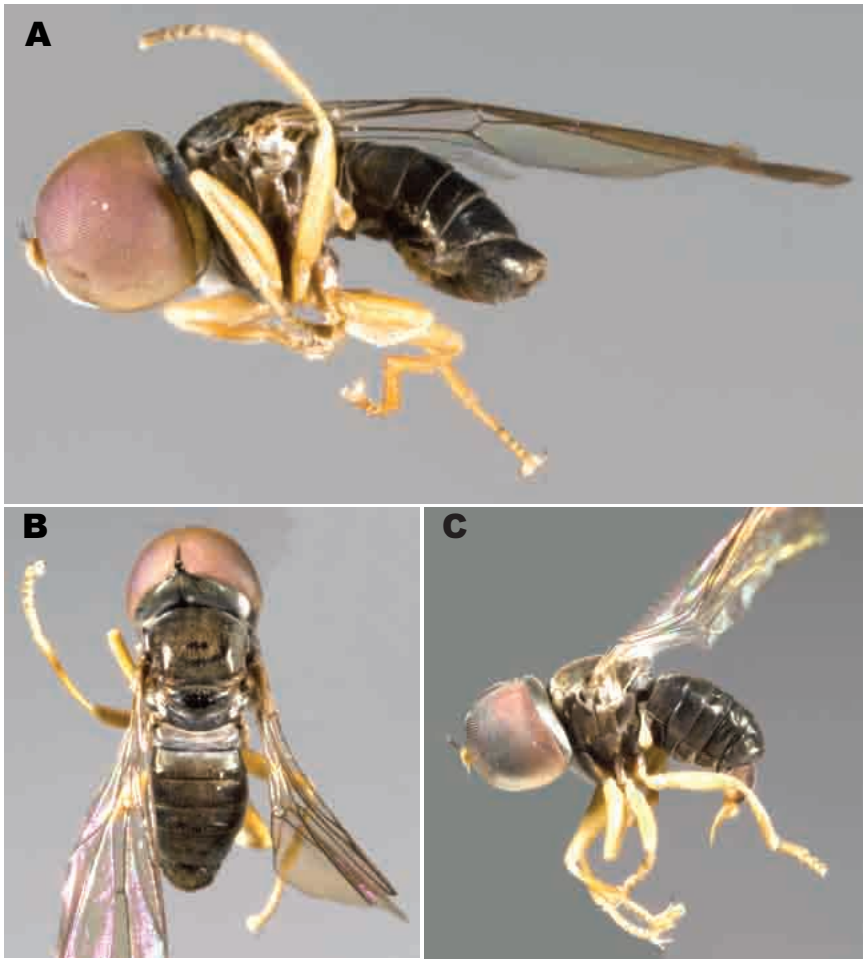

Figure 1. Photographs of *Tomosvaryella cagiae*. **A**. left lateral of male, FBA508874. **B**. dorsal of male, FBA508874. **C**. left lateral of allotype female, FBA501452.

(Fig. 2B). Epandrium blackish, becoming paler brown distally, slightly longer than wide; asymmetrical, right side longer (Fig. 2A). Subepandrial sclerite mostly bare, with small cluster of distal bristles continuous with bristles along medial edge of surstylus (Fig. 2B). Hypandrium asymmetrical with left gonopod projecting farthest; right gonopod more concave, rounded, than left (Fig. 2F); base of hypandrium on 45 degree angle to phallic guide and phallus (Fig. 2E). Phallus trifid, simple tubes with round openings (Fig. 2E). Phallic guide shorter than projecting phallus, pointed, with sheath over all but tip; with 4-5 bristles on each side near tip, bristles closer to tip on right side; tip pointed down at less than 30 degrees in lateral view (Figs. 2F, G). Ejaculatory apodeme axe-shaped (Fig. 2H).

Female. As male except: Dichoptic. Frons widest medially, ventral third silver-pubescent, middle third brown-pubescent, upper third glossy to matte black. Facets on front of eyes enlarged.

Ovipositor piercer yellow, short, downcurved, 0.91–0.92 mm (Figs. 1C, 2J). Ovipositor base brown, with no protuberances (Figs. 1C, 2J). OL:PL 1.95–1.97:1; BL:OL 3.32–3.49:1; B:PL 0.92–1.03:1.

Material examined. *Types*: *Holotype* ♂: FIJI: **Viti Levu:** 4 km NW Lami Town, Mt. Korobaba, 18º6'7"S, 178º22'59"E, 1–13.xii.2004, leg. K. Koto, 400 m, Malaise 1, FBA501443 (FNIC). *Allotype* ♀: FIJI: **Viti Levu:** 4 km NW Lami Town, Mt. Korobaba, 18º6'14"S, 178º22'52"E, 1-13.xii.2004, leg. K. Koto, 260 m, Malaise 5, FBA501452 (CNC). *Paratypes*: **Fiji: Viti Levu:** 1.5 km SW Vaturu Dam, 17º44'38"S, 177º40'34"E, 23.ix.–6.x.2004, A. Namaqa, 550 m, 1♂, Malaise 1, FBA508874 (CNC); Naitasiri Prov[ince], Nakobalevu M[oun]t[ain], 18º3'S, 178º25'E, 22.ix.–9.x.2002, M. Irwin, E. Schlinger, M. Tokota'a, 340 m, rainforest, 1♂, Malaise trap FJ-4, JSS16405 (CNC); 4 km WSW Colo-i-Suva Village, Mt. Nakobalevu, 18º3'25.2"S, 178º25'12"E, 12.x.–12.xi.2004, leg. Timoci, 300 m, 1♂, Malaise 1, FBA507648 (HNHM); 4 km WSW Colo-i-Suva Village, Mt. Nakobalevu, 18.056ºS, 178.422ºE, 15–24.x.2003, Timoci, 325 m, 1♀, Malaise 2, CNCD5369 (HNHM); same data as holotype, 1♂, FBA508858 (CNC); **Taveuni:** Cakaudrove Prov., 5.5km SE of Tavuki Village Devo Peak, 16º50'35"S, 179º57'58"E, 7–23.x.2004, P. Vodo, 1188 m, 1♂, Malaise 2, FBA508931 (BPBM); 3.2 km NW Lavena V[il]l[a]g[e], Mt. Koronibuabua, 16º51'18"S, 179º53'20.4"W, 5-19.ii.2005, B. Soroalau, 219 m, 1♀, Malaise 4, FBA508865 (BPBM); 3.2 km NW Lavena V[il]l[a]g[e], Mt. Koronibuabua, 16.855ºS, 179.891ºW, 28.x.–13.xi.2004, B. Soroalau, 234 m, 1♀, Malaise 2, FBA522136 (CNC).

Etymology. *Tomosvaryella cagiae* is named in honor of Akanisi Caginotoba ("Cagi") for her tremendous contribution to the Fiji Terrestrial Arthropod Survey.

Remarks. Only eight specimens of this species have been collected so inferences about behaviour or phenology are tentative. The flight period appears to be between late September and mid February (austral spring and summer). Specimens have been collected at a wide range of elevations (219 to 1188 m). *Tomosvaryella cagiae* appears to be the sister species of *Tomosvaryella moala*, but more work on Pacific *Tomosvaryella* is needed to test this hypothesis.

Distribution. Known from Taveuni and Viti Levu, Fiji.

Tomosvaryella corusca Skevington & Földvári**, new species**
(Figs. 3–4)

Diagnosis. Both sexes: Scutum black, shining purple and blue from some angles (Fig. 3B). Scutellum black, shining green from some angles (Fig. 3B). Subscutellum with silver lateral pruinescence and brown medial pruinescence. Halter pale with black knob (Fig. 3B). Coxae, trochanters, femora, and tibiae black (Figs. 3A, C). Tergite 1 brown pruinescent with 4 long lateral, black hairs. Tergites 2–5 shining iridescent blue (also appearing purple or green depending on the angle), pruinescence restricted to narrow pair of angled brown stripes on tergite 2 (Fig. 3B). **Male:** Sternite 5 with a pair of swollen structures connected by a chitinized bridge (Fig. 4H). Membranous area present, occupying about half of syntergosternite. Surstyli yellow, similar in shape but with left surstylus longer; narrow, simple, slightly hooked at tips (Fig. 4A). Subepandrial sclerite with elongate lateral patches of small setae (Fig. 4A). Phallic guide very narrow (no wider than phallus), with cluster of 5–6 bristles on left side near tip (Figs. 4E, F). **Female:** Frons with ventral quarter silver-pubescent, transitioning to matte brown over next quarter; glossy black on dorsal half. Piercer yellow, long, downcurved (Figs. 3C, 4D). Ovipositor with no medial protuberance (Fig. 4D).

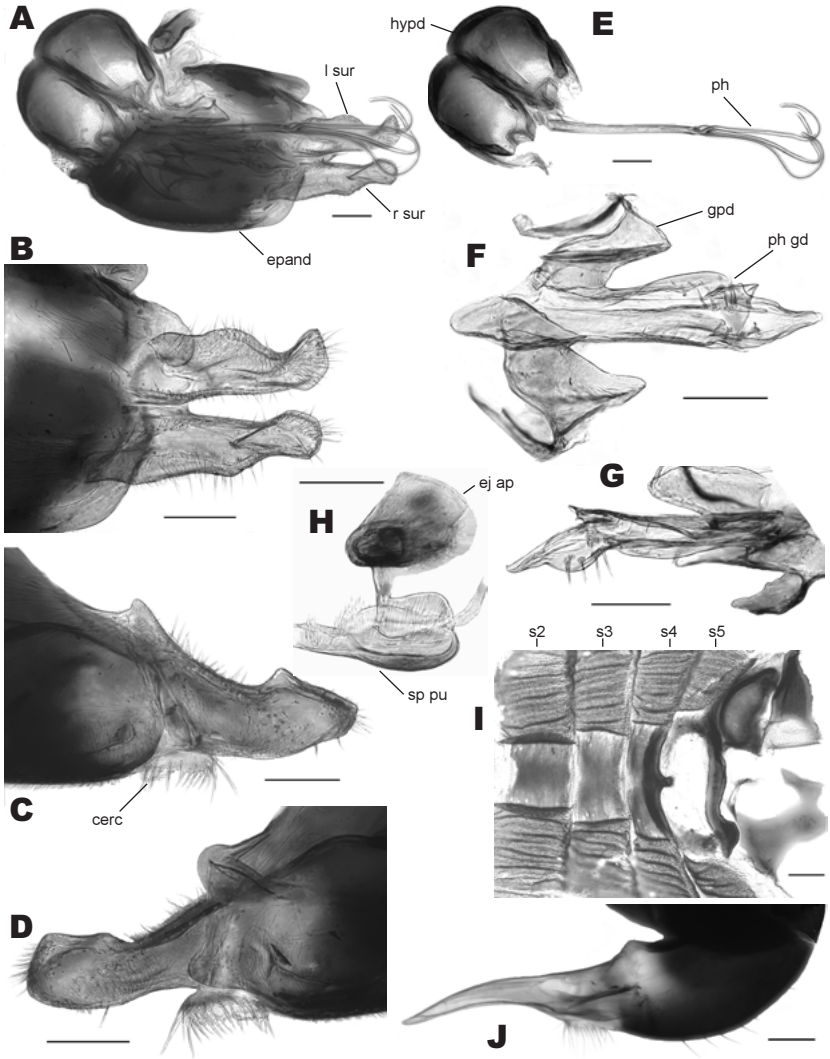

Figure 2. *Tomosvaryella cagiae*. **A**. dorsal of male terminalia, FBA507648. **B**. dorsal of male surstyli and subepandrial sclerite, FBA507648. **C**. right lateral of male surstyli, FBA507648. **D**. left lateral of male surstyli, FBA507648. **E**. dorsal view of hypandrium and phallus of male, FBA507648. **F**. dorsal of phallic guide of male, FBA507648. **G**. left lateral of phallic guide of male, FBA507648. **H**. lateral of ejaculatory apodeme and sperm pump of male, FBA507648. **I**. ventral of male abdomen, FBA507648. **J**. left lateral of female ovipositor, FBA508865. Abbreviations: cerc = cerci; ej ap = ejaculatory apodeme epand = epandrium; gpd = gonopod; hypd = hypandrium; l sur = left surstylus; r sur = right surstylus; ph = phallus; ph gd = phallic guide, s = sternite, sp pu = sperm pump. Scale bars = 0.1 mm.

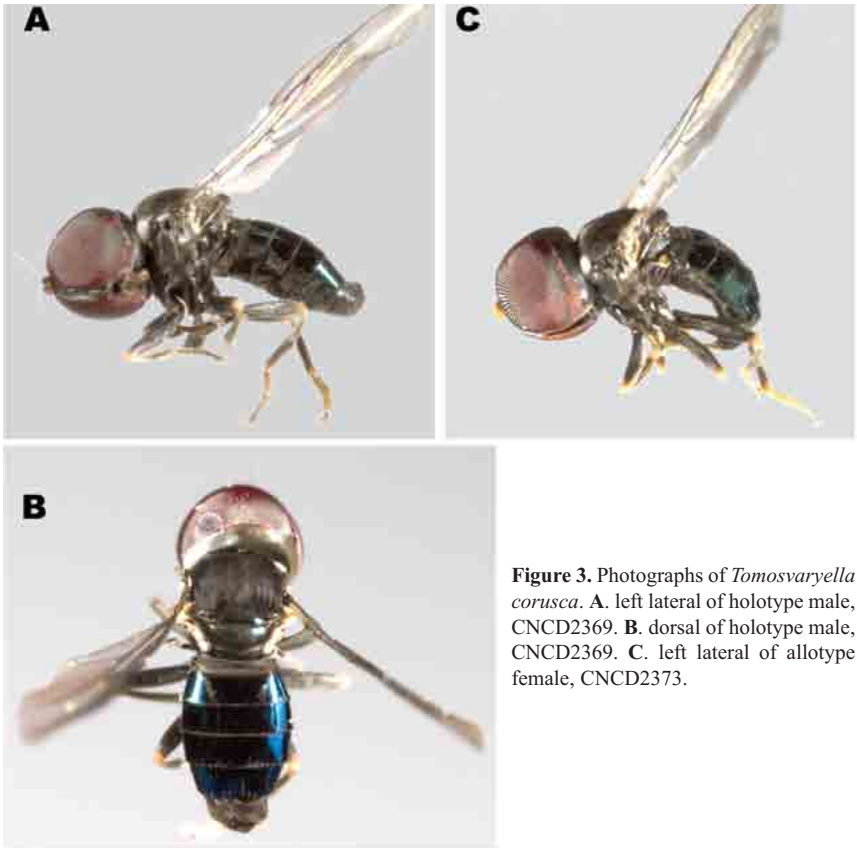

Figure 3. Photographs of *Tomosvaryella corusca*. **A**. left lateral of holotype male, CNCD2369. **B**. dorsal of holotype male, CNCD2369. **C**. left lateral of allotype female, CNCD2373.

Description. Lengths: Body: 2.7–3.0 mm; wing: 2.8–2.9 mm.

Male. *Head*. Holoptic. Arista dark brown. Flagellum brownish yellow, long acuminate. Pedicel brown with 3 dorsal bristles and no ventral bristles. Scape brown with no bristles. Labellum and palps yellow. Frons silver-pubescent. Occiput silver-pubescent laterally, brown-pubescent dorsally.

Thorax. Postpronotal lobe pale yellow. Scutum black, shining purple and blue from some angles, covered with brown pruinescence (Figs. 3A–C). Scutellum black, shining green from some angles, with weak posterior setae. Pleuron black to brown with sparse brown pruinescence (Fig. 3A); subscutellum black with silver lateral pruinescence and brown medial pruinescence. Halter pale with black knob (Fig. 3B).

Legs. Coxae, trochanters, femora, and tibiae black; dorsal surface of tarsi brown, ventral surface pale yellow; all setae yellow except for black ctenidial spines on fore and mid femora (Figs. 3A, C). Pale hairs on posterior side of hind femur variable length; longest at distal 1/3, as long as 2/3 width of tibia at tip. Trochanters simple (no spines or protuberances).

Wing. Fourth costal section about 3 times as long as third, C_4:C_3 2.8–3.8:1; R-M situated near middle of discal medial cell (dm), S_3:S_2 1.2–1.4:1. Most of wing uniformly microtrichose except as

follows: cell c bare on proximal third, sc bare, r_1 bare in proximal corner, br bare on proximal quarter, bm bare except near distal corner, cup bare on proximal half, and a_1 bare on proximal quarter.

Abdomen. Tergite 1 brown pruinescent with 4 long lateral, black hairs. Tergites 2–5 shining iridescent blue or purple depending on the angle, pruinosity restricted to narrow pair of angled pale brown stripes on tergite 2 (Fig. 3B). Sternites black. Sternite 4 simple (Fig. 4H). Sternite 5 with a pair of swollen structures connected by a chitinized bridge (Fig. 4H). Syntergosternite 8 black. Membranous area present, occupying about half of syntergosternite.

Male genitalia. Surstyli yellow, similar in shape but with left surstylus longer; narrow, simple, slightly hooked at tips (Fig. 4A). Epandrium black, longer than wide; asymmetrical, right side longer (Fig. 4A). Subepandrial sclerite with elongate lateral patches of small setae (Fig. 4A). Hypandrium almost symmetrical (Fig. 4E). Phallus trifid, simple tubes with round openings (Figs. 4E, F). Phallic guide shorter than projecting phallus, very narrow (no wider than phallus), pointed, with cluster of 5–6 bristles on left side near tip (Figs. 4E, F). Ejaculatory apodeme boot-shaped, darkest near base (Fig. 4G).

Female. As male except: Dichoptic. Frons only slightly enlarged medially, ventral quarter silver-pubescent, transitioning to matte brown over next quarter; glossy black on dorsal half. Facets on front of eyes enlarged. Ovipositor 0.82 mm long (Fig. 4D). Piercer yellow, long, downcurved (Figs. 3C, 4D). Ovipositor base black, with no medial protuberance (Figs. 3C, 4D). OL:PL 1.49:1; BL:OL 3.44:1; B:PL 0.54:1.

Material examined. *Types*: *Holotype* ♂: FIJI: **Kadavu**: Vunisea Village, Korosalusalu Mountain, trail above microwave tower, 19º3'14"S, 178º9'51"E, 23.i.2006, J. Skevington, ~200 m, hilltopping, CNCD2369 (FNIC). *Allotype* ♀: same data as holotype, CNCD2373 (CNC). *Paratypes*: FIJI**: Kadavu:** same data as holotype, 7♂, CNCD2365-8, 2370-2 (BPBM, CNC, FNIC, HNHM); Solodamu, 19º4'S, 178º7'E, 25.viii.–23.x.2003, E.I. Schlinger, M. Irwin, M. Tokota'a, 128 m, in coastal limestone forest, 1♂, Malaise trap FJ-41B, FBA15859 (CNC).

Etymology. From the Latin "*corusco*" for flashing, gleaming or glittering, in reference to the glittering blue abdomens of these flies.

Remarks. Only ten specimens of this species have been collected during two collecting events so inferences about phenology are not possible. This is one of the only species of pipunculid discovered hilltopping in Fiji so far [see Skevington (2001) for a discussion of hilltopping in Pipunculidae]. Few species of *Tomosvaryella* hilltop, so it is particularly surprising that one of the few Fijian hilltopping species is from this genus (Skevington, 2000, 2001). The spectacular colouration must be used for display during hilltopping. Males patrolling a hilltop on Korosalusalu Mountain did not hover motionless or stay over one landmark like most hilltopping pipunculids. Instead, they actively darted back and forth across the trail, glittering in the sun. The female colouration is similar and suggests that females also display, or at least use their colour to allow quick species recognition by males.

Distribution. Endemic to Kadavu, Fiji.

Tomosvaryella moala Skevington & Földvári**, new species**
(Figs. 5–6)

Diagnosis. Both sexes: Halter yellow. Trochanters, femora, tibiae, and tarsi all yellow; all setae yellow except for black ctenidial spines on femora (Figs. 5A, C). Tergite 1 with 2-3 long lateral, yellowish hairs. Tergites 2-5 black, mostly shining, appearing greenish at some angles (Figs. 5A–C). **Male:** Sternite 4 simple (Fig. 6I). Sternite 5 slightly concave

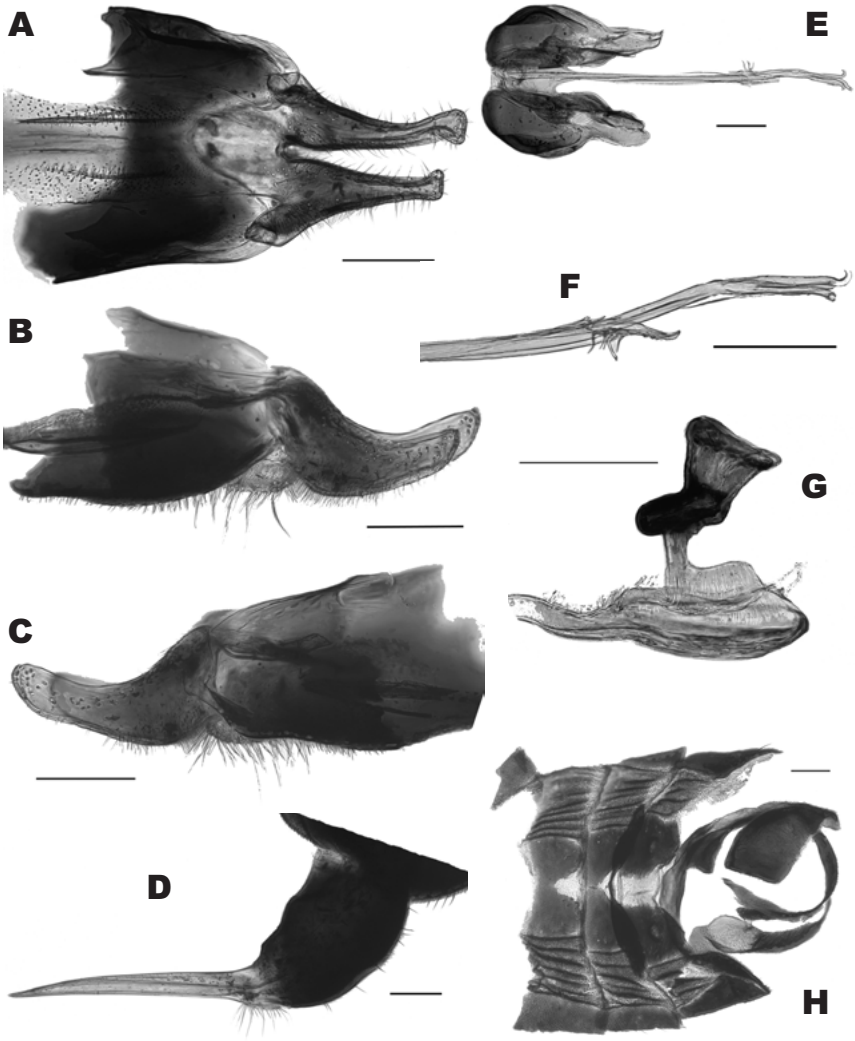

Figure 4. *Tomosvaryella corusca*. **A**. dorsal of male surstyli, subepandrial sclerite and part of epandrium, CNCD2367. **B**. right lateral of male surstyli, CNCD2367. **C**. left lateral of male surstyli, CNCD2367. **D**. left lateral of allotype female ovipositor, CNCD2373. **E**. dorsal view of hypandrium, phallus and phallic guide (latter mostly concealed) of male, CNCD2367. **F**. right lateral of phallus and phallic guide of male, CNCD2367. **G**. lateral of ejaculatory apodeme and sperm pump of male, CNCD2367. **H**. ventral of male abdomen, CNCD2371. Scale bars = 0.1 mm.

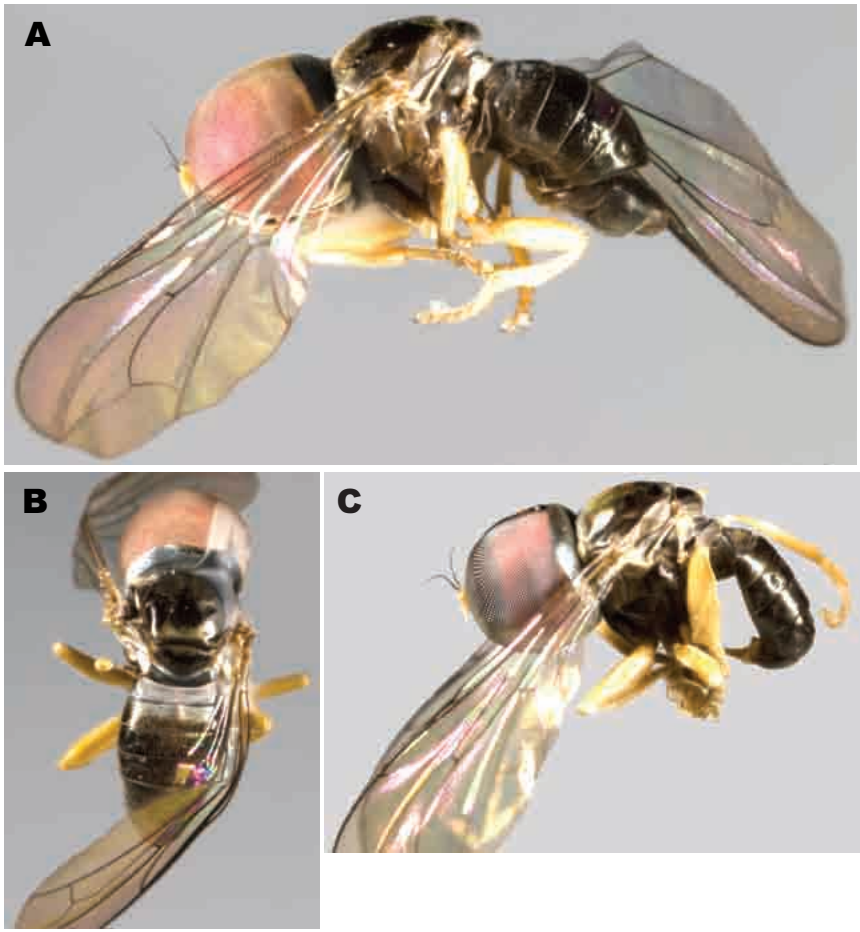

Figure 5. Photographs of *Tomosvaryella moala*. **A**. left lateral of male, FBA508477. **B**. dorsal of male, FBA508477. **C**. left lateral of allotype female, FBA508463.

with medial projection and lateral rectangular projections (Fig. 6I). Membranous area occupying over half of syntergosternite. Surstyli yellow, somewhat asymmetrical; narrow, expanded distally (Fig. 6B). Right surstylus wider, more angular than left. Epandrium with right side nearly twice as long as left (Fig. 6A). Subepandrial sclerite bare (Fig. 6B). Phallic guide with tip angled down at 45 degrees in lateral view (Fig. 6G). **Female:** Frons with ventral half silver-pubescent, upper half glossy black. Ovipositor piercer long, only slightly downcurved (Fig. 6J). Ovipositor base with medial protuberance (Figs. 5C, 6J).

Description. Lengths: Body: 3.3–3.6 mm; wing: 3.6–4.0 mm.

Male. *Head*. Holoptic. Arista brownish yellow. Flagellum yellow, long acuminate. Pedicel yel-

lowish brown with 2-3 dorsal bristles and no ventral bristles. Scape brown with no bristles. Labellum and palps yellow. Frons silver-pubescent. Occiput silver-pubescent laterally, sparsely brown-pubescent dorsally.

Thorax. Postpronotal lobe yellow. Scutum black, with sparse brown pruinescence on all except anterolateral corners where replaced with silver (Fig. 5B). Scutellum black with weak posterior setae. Pleuron brown with sparse brown pruinescence (Fig. 5A); subscutellum black with silver pruinescence. Halter yellow (Fig. 5A).

Legs. Coxae brown; trochanters, femora, tibiae, and tarsi all yellow; all setae yellow except for black ctenidial spines on femora (Figs. 5A-C). Pale hairs on distal half of posterior side of hind femur longest in middle, as long as 1/3 of width of tibia at tip. Trochanters simple (no spines or protuberances).

Wing. Fourth costal section about 2-3 times as long as third, C_4:C_3 1.8-2.5:1; R-M situated near middle of discal medial cell (dm), S_3:S_2 1.0-1.1:1. Most of wing uniformly microtrichose except as follows: cell c bare on proximal half to two thirds, sc bare, r_1 bare in proximal third, br bare on proximal quarter to half, bm bare except near distal corner, cup and a_1 bare on proximal half to two thirds.

Abdomen. Tergite 1 silver pruinescent with 2-3 long lateral, yellowish hairs. Tergites 2-5 black, mostly shining, appearing greenish at some angles (Figs. 5A-C). Sternites 1-5 and 7 black. Sternite 6 brownish. Sternite 4 simple (Fig. 6I). Sternite 5 slightly concave with medial projection and lateral rectangular projections (Fig. 6I). Syntergosternite 8 black. Membranous area present, occupying over half of syntergosternite.

Male genitalia. Surstyli yellow, somewhat asymmetrical; narrow, expanded distally (Fig. 6B). Right surstylus wider, more angular than left (Fig. 6B). Epandrium yellowish brown, longer than wide; asymmetrical, right side nearly twice as long (Fig. 6A). Subepandrial sclerite bare (Fig. 6B). Hypandrium asymmetrical with left gonopod projecting farthest; right gonopod more concave, rounded, than left (Fig. 6F); base of hypandrium on 45 degree angle to phallic guide and phallus (Fig. 6E). Phallus trifid, simple tubes with round openings (Fig. 6E). Phallic guide shorter than projecting phallus, pointed, with sheath over all but tip; with 4-5 bristles on each side near tip, bristles closer to tip on right side; tip angled down at 45° in lateral view (Figs. 6F, G). Ejaculatory apodeme axe-shaped (Fig. 6H).

Female. As male except: Dichoptic. Frons widest medially, ventral half silver-pubescent, upper half glossy black. Facets on front of eyes enlarged. Ovipositor 0.94 mm long. Piercer yellow, long, only slightly downcurved (Fig. 6J). Ovipositor base brown, with medial protuberance (Figs. 5C, 6J). OL:PL 1.74:1; BL:OL 3.56:1; B:PL 0.72:1.

Material examined. *Types*: *Holotype* ♂: FIJI: **Viti Levu**: 1.8 km E Navai Village, old trail to Mt. Tomaniivi, 17º37'16"S, 177º59'53"E, 16.xi.–28.xii.2004, E. Namatalau, 700 m, Malaise 4, FBA508842 (FNIC). *Allotype* ♀: same data as holotype, 6.v.–20.vi.2005, E. Namatalau, 700 m, Malaise 4, FBA508463 (CNC). *Paratype*: FIJI**: Viti Levu:** same data as holotype, 16.iii.–6.v.2005, E. Namatalau, 100 m [error, should be 700 m?], 1♂, Malaise 4, FBA508477 (CNC).

Etymology. *Tomosvaryella moala* is named in honor of Moala Tokota'a for his tremendous contribution to the Fiji Terrestrial Arthropod Survey. Moala ran the field component of the project. He has a tremendous ability to motivate and involve other Fijians in conservation endeavours such as this survey.

Remarks. The three known specimens of this species area all from the trail to Mt. Tomaniivi on Viti Levu. Based on the few records, the species appears to fly throughout the year.

Distribution. Known from Taveuni and Viti Levu, Fiji.

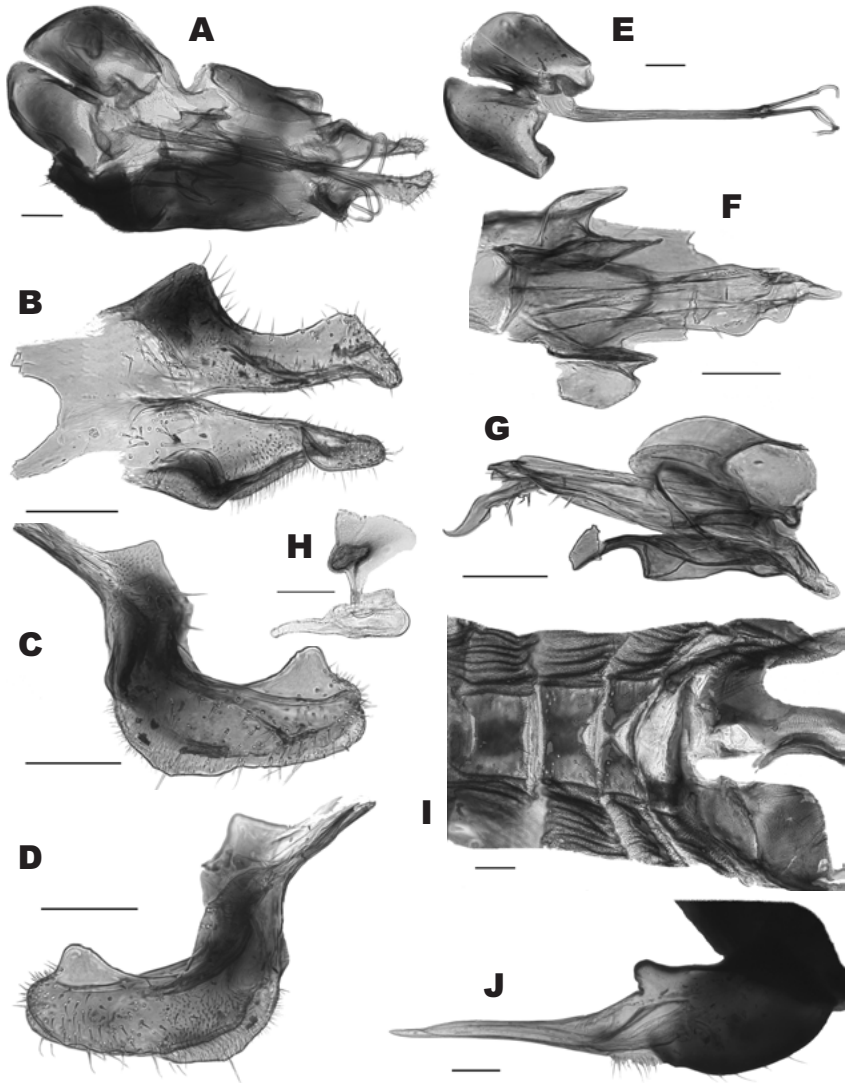

Figure 6. *Tomosvaryella moala*. **A**. dorsal of holotype male terminalia, FBA508842. **B**. dorsal of male surstyli and subepandrial sclerite, FBA508477. **C**. right lateral of male surstyli, FBA508477. **D**. left lateral of male surstyli, FBA508477. **E**. dorsal view of hypandrium and phallus of male, FBA508477. **F**. dorsal of phallic guide of male, FBA508477. **G**. left lateral of phallic guide of male, FBA508477. **H**. lateral of ejaculatory apodeme and sperm pump of male, FBA508477. **I**. ventral of holotype male abdomen, FBA508842. **J**. left lateral of allotype female ovipositor, FBA508463. Scale bars = 0.1 mm.

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FIJI ARTHROPODS VIII

(edited by N.L. Evenhuis & D.J. Bickel)

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